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September 6, 1934

Engineering Library

AUG 10 1934

Engineering News-Record

Excavation in basaltic formation for the 59-ft. single-lift lock around Bonneville Dam on the Columbia River in Oregon. Two weeks ago the plans for this work were changed to provide for ocean-going vessels of 27-ft. draft instead of the 10-ft. draft barges originally contemplated.

Electric Lock Control on the Welland Canal

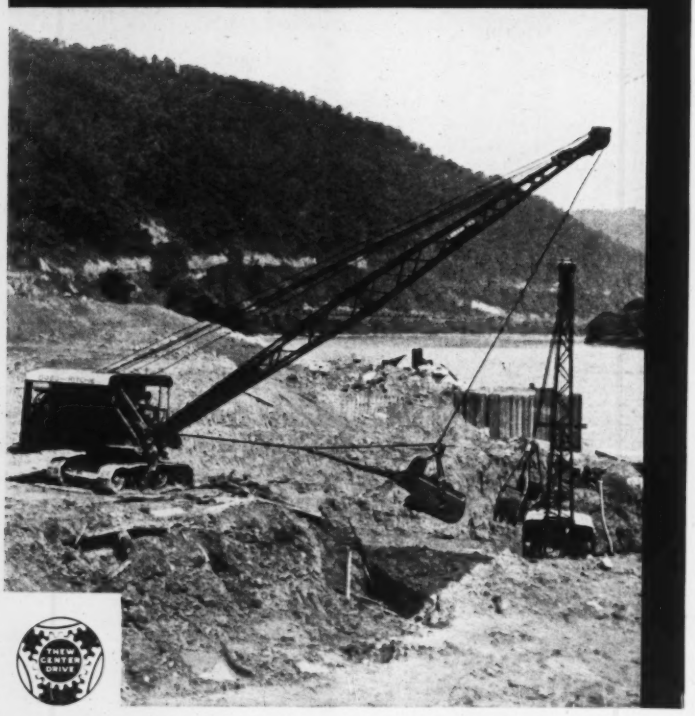
Building Cost Trends Since 1928

Modern Planning and Design on a New Jersey Highway

Concrete Materials Handling at Norris Dam

Notes on Vibrated Concrete for a Dutch Bridge

What BOSO & RITCHIE *found out about the* NEW 1½ YD. LORAIN-77 DIESEL



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GREATER SHOVEL OUTPUT

In gumbo digging, this Diesel Lorain averaged from 2600 to 3000 yds. in 14 hrs. daily—and has loaded as many as 190—8 yd. wagons in 4½ hrs.—or over 330 yds. an hour.

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40 gals. of fuel oil keep this Diesel Lorain running 14 hrs.—at a cost of about $3.00—a gas machine on the same job uses $12.60 of fuel in 14 hours.

★

THE JOB . . . . . .

175,000 yds. to be excavated for the hydro-electric plant of the Kanawha Valley Power Co., at London Locks and Dam on the Kanawha River. Excavating Contractors, Boso & Ritchie, Ravenswood, W.Va., owners of 5 Lorains.

★

100′ DRAG CABLE MOVES 30,000 YDS.—STILL GOING

This same Diesel Lorain, as a dragline, is digging 30 ft. below its treads and is handling 1800 yds. in 14 hrs.—all loaded. Using a 100 ft. drag cable and a new style L-77 fairlead, it had moved (up to Aug. 8) 30,000 yds. and was still using the same cable.

★

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★

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Carry On!

LAST January the President approved the Code of Fair Practice for the Construction Industry. Next June the statute under which the code was established will lapse unless it be reenacted by Congress or superseded by another measure designed to continue its effect.

No other industry faced a more formidable or complicated task of code-making. To achieve unity of action among its numerous and diversified elements was in itself no small undertaking. To reconcile conflicting views and interests and to set up an administrative structure that would safeguard them all was a prodigious task.

From time immemorial this basic industry, which affects so profoundly the economic welfare of the American people, had suffered from evils that resulted from its dispersed nature. For years its leaders had seen the need for better integration and, through one device or another, had striven to realize it.

Eventually, through the construction code, the industry took its first substantial step toward a constructive handling of its basic problems. It is noteworthy that this code is one of those that does not seek to conserve the interests of its industry at the expense of its customers. It is singularly free from any of those provisions that now are under attack, whether fairly or unfairly, on the ground that they exploit the public. It does not attempt to close the door on new enterprise, neither does it provide for any control over the price of its product. It is just what its name implies—a code of fair practice, designed to curb destructive and unfair practices within its own ranks.

In the short period that has elapsed since the establishment of the code much has been accomplished, but the job is too involved and far-reaching for us to expect that by this time the code would have justified itself by its works. Those who are impatient with progress to date should, in all fairness, take account of the exceptional obstacles that must be surmounted.

The industry does not consist of a relatively small number of large producing units such as compose the bulk of the manufacturing industries. In general it does not enjoy the unifying influence of having to sell its product in a national market. On the contrary, it is composed of innumerable independent units, ranging in size from very small to fairly large, many of them operating within restricted territories and subject to substantial turnover.

From the nature of construction work, the established procedure in the award of contracts and the competitive methods fostered by its customers, it tends to breed sturdy individualists, unused to cooperative effort and suspicious of anything that looks like a curb on individual liberty of action. The very conditions that have bred strong and resourceful men have bred also a psychology of the lone wolf that hampers the achievement of unity and cooperation.

Six months is far too short a time in which to integrate such an industry and to demonstrate the value of such integration. Six years would not be over-long. Yet within the next six months the industry must be prepared to appraise its progress to date and to apply its experience to the formulation of an enduring program. Never before has it enjoyed so promising an opportunity to set its house in order; should it miss this one, it may never have another.

So this is no time for disappointment, carping complaints or impatient resentment. It is no time for sweeping condemnation based on isolated cases or personal grievances. Rather is it a time for honest, painstaking and impersonal appraisal of what has been done, what can be done and what should be done for the general welfare of all who compose the industry.

Only such a constructive effort will conserve the progress already made and carry forward the effort to establish the industry to a sound and permanent basis. And such a consummation will be in the interest not alone of the building industry but also of the entire building community.

Willard Chevalier

ENGINEERING NEWS-RECORD

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DR. MILLER MCCLINTOCK, nationally known traffic expert, director of the Albert Russell Erskine Traffic Bureau of Harvard University, has prepared "Short Count Traffic Surveys." He has been employed by Los Angeles, San Francisco, Chicago, Boston and other cities as the acknowledged authority in his line.

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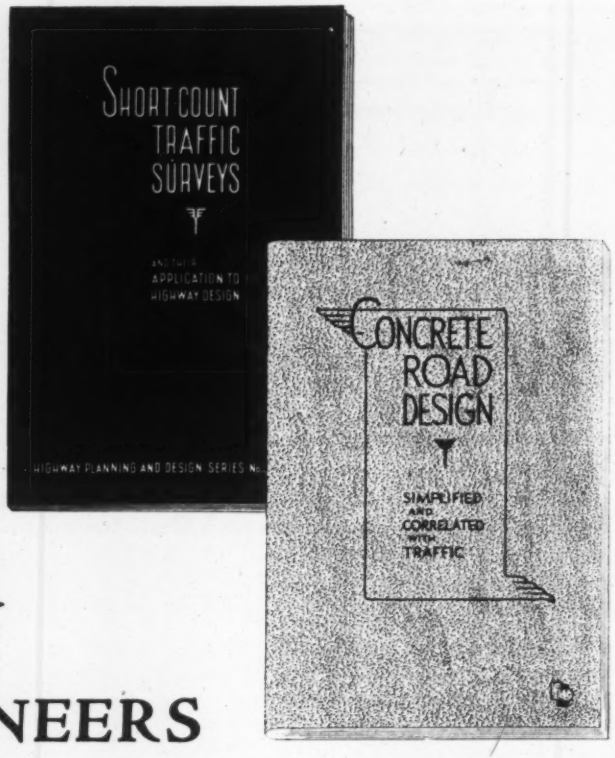
FRANK T. SHEETS, for 9 years Chief Highway Engineer of the State of Illinois, now Consulting Engineer of the Portland Cement Association, is the author of "Concrete Road Design." Ten thousand miles of concrete roads were built on the Illinois State Highway System under his direction.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In the News:

The National Society of Professional Engineers was organized on Labor Day. Important in the cooperating groups are the National Council of State Boards of Engineering Examiners, the American Association of Engineers and several state societies. The new society aims to coordinate the activities of the state societies of professional engineers and to represent them nationally.

In Germany the Congress of Highway Engineers is meeting, and at the opening session heard Rudolf Hess, who asserted that 250,000 men will be kept at work on national highway construction for the next six or seven years.

Bids Have Been Called for 110 miles of siphons, canals and conduits for the Colorado River Aqueduct by the Metropolitan Water District. This section of the gigantic water-supply project is estimated to cost $35,000,000 and will employ about 2,000 men for a four-year construction period.

The Randolph St. railroad terminal site fronting on Lake Michigan has been approved by the Chicago Plan Commission.

Water and Power Revenue totaling $1,302,000 from the funds of the Los Angeles municipal utilities will be advanced to aid the general fund of that city and obviate an increase in the present tax rate.

Great Salt Lake has dwindled to the lowest level in history. It is already 2 in. below the previous record set in 1905, and the normal fall decline would lower the surface another foot before January.

In This Issue:

Lock Operations on the Welland Canal between Lake Ontario and Lake Erie are controlled by elaborate interlocking electric mechanism of rugged design to insure continuity of service, reduce the time required in locking and provide maximum safety for the structures. Severity of climate, which necessitates a four-month winter shut-down added to design problems. The equipment and operating control features are described.

A Four-hour Expedition through the maze of PWA headquarters to secure a half-hour interview on an answer to a six-months-old query is described by an engineer. His directions from office to office required frequent reference to the employment list "as of today."

A Decline in construction costs of 40 per cent from 1928 to 1934 for four quite similar university buildings is indicated in an analysis presented with detailed statistics. A 397,000-cu.ft. building constructed in 1928 cost 68.68c per cubic foot, as compared to a cost of 40.65c. for a 1,054,000-cu.ft. structure with more elaborate finishing started this year.

Trial Use of external vibrators for consolidating concrete on a grade-crossing separation structure in Holland resulted in the conclusion that they be "recommended only with caution and each case should be carefully studied," according to the Dutch engineer. A no-slump mix which was readily handled in a test cube was found too dry for use in heavily reinforced sections. Care in form construction and length of the period of vibration was advised.

Production of aggregate for the 1,000,000 cu.yd. of concrete that will form the Norris Dam being built by the TVA is outlined in an article which reviews the sequence of operations from quarry to concrete-mixing plant. Coarse aggregate and sand will be crushed from quarried limestone.

Approaching colder weather raises the question of the age-strength relation between concrete cured in the laboratory at 70 deg. and concrete exposed at a lower temperature. The relative strength, in percentage of the standard specimen and concrete cured at 50 deg., is presented by A. G. Timms, Portland Cement Association, in a set of curves.

Modern Highway Location and design are well illustrated in the reconstruction of the Pompton Turnpike in New Jersey. The new alignment, bypassing towns and minimizing stream crossings, is based on traffic-count data. Continued difficulty with uneven joints in the concrete-paving slab led to tests which resulted in a new joint design providing adequate dowel strength and watertightness.

Coming Articles:

An Appraisal of the accomplishments of the Tennessee Valley Authority up to the end of its second summer is to be published in the issue of Sept. 20. Its definite accomplishments along certain lines are outlined, and the fields of action in which it has been able to accomplish little or nothing are discussed.

Next Week's Issue will include a group of six articles illustrating some late technical developments in the field of water-supply engineering. This treatment of the subject is occasioned by the annual meeting of the New England Water Works Association in Boston during the week of Sept. 17.

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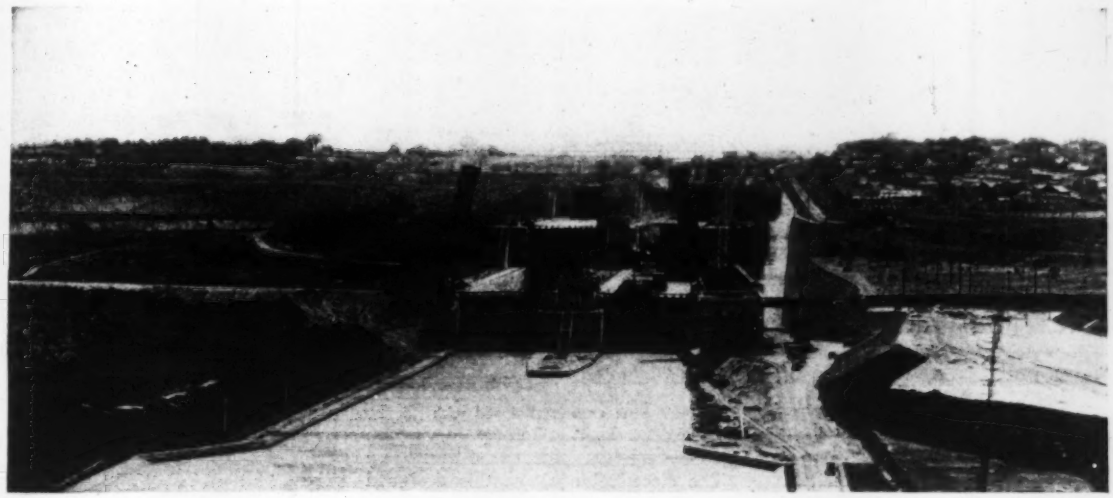


FIG. 1—THE FLIGHT LOCKS at Thorold on the Welland Canal. Locks 4, 5 and 6 are built as twin locks to permit simultaneous movement in both directions. At the top right center is Lock 7, some distance beyond the flight locks, completing the rise over the Niagara escarpment. On the right lock wall in the foreground is the power house in which electric power for the canal is generated.

Dependable Canal Operation by Rugged Electrical Control

Welland Canal operation under interlocked electrical control proves highly dependable—Control apparatus simply and ruggedly built

By Ralph G. Lockett

Electrical Engineer, Cutler-Hammer, Inc., Milwaukee, Wis.

WHEN the Welland Canal was built, special consideration was given to provisions for insuring continuity of service and reliability of operation. Electrical operation was provided throughout, operations that should be made only in sequence were interlocked, and each operation was controlled by electrical apparatus designed to meet the special requirements of that operation. The principal operations so controlled are handling of the lock gates, opening and closing of the valves for filling and emptying lock chambers, automatic regulation of the weir gates of the storage ponds along the canal, and operation of safety devices and auxiliaries such as the capstans for occasional moving of vessels within the locks.

All conductors were armored and so installed as to reduce the chance of failure to a minimum. Due to climatic conditions, there is a period each year (Dec. 15 to April 15) during which the machinery is not operated in normal service. Extreme care therefore was exercised to insure proper operation after each period of idleness. Further, as extremely high humidity prevails around the operating equipment throughout most of the year, the electrical apparatus had to be properly protected against both moisture and the combination of moisture and a period of disuse. Operating experience to date has demonstrated that the provisions for meeting these conditions that were made at the time of construction were entirely adequate.

The present canal was officially opened to traffic in August, 1932, although it was opened to down-traffic in September, 1930. A full description of it was published in *Engineering News-Record*, Sept. 4, 1930, p. 356. Spanning the peninsula between Lake Ontario and Lake Erie, just west of Buffalo, the canal provides a waterway 25 miles long, 25 ft. deep, connecting the two lake levels, which differ by 326 ft. The locks and all concrete structures provide for a maximum draft of 30 ft., so that future dredging of an additional 5 ft. will provide a 30-ft. draft throughout. An outstanding feature of the canal is the extremely high lift of the locks, 46½ ft., or 14 ft. more than the locks of the Panama Canal and 6 ft. more than the maximum lift of the New York Barge Canal locks. This high lift called for gates of unprecedented heights and for extremely accurate and dependable gate-handling machinery.

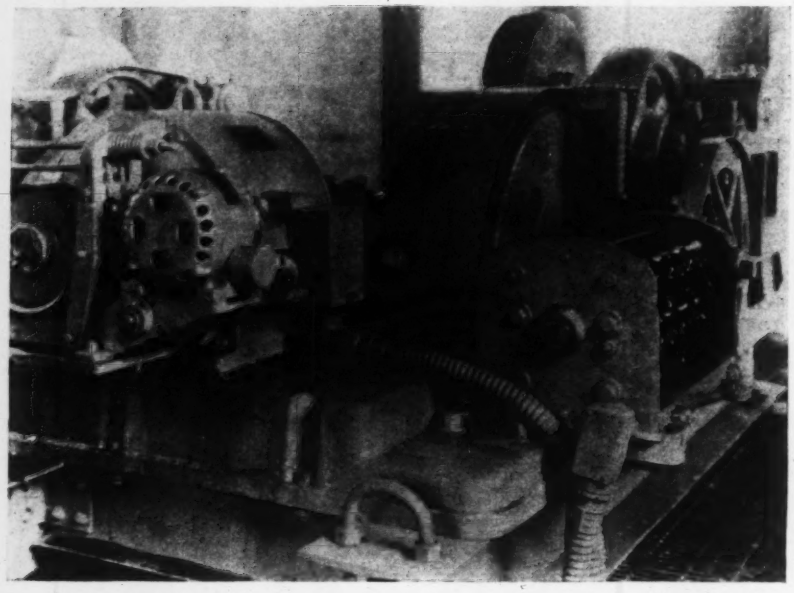


FIG. 2—FOR ACCURATE HANDLING of the tainter gates each is equipped with a geared limit switch and a magnetic brake of the torque-motor type, as shown here.

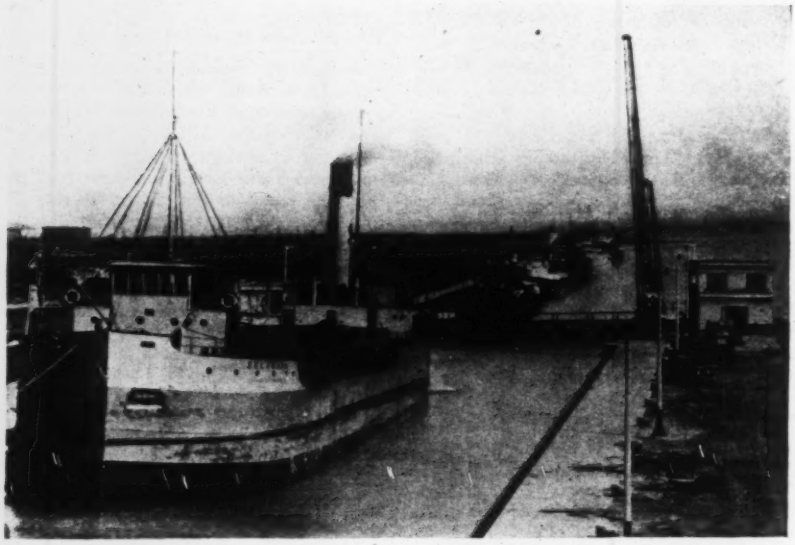
Notable also is the flight of three twin locks shown in Fig. 1. At Thorold, Ont., the canal descends the face of the Niagara escarpment. There the slope is so steep that three of the four locks required are set so that a ship leaving the first lock enters the second directly and enters the third in the same manner, with no open canal or basin intervening. As the time required for the up or down movement through this flight of three locks was a limiting factor in the canal capacity, the locks were made twins to permit simultaneous movements in each direction. This obviously called for accurate and dependable control devices.

The electrical equipment is designed to use alternating current now generated by the canal itself, employing squirrel-cage or slip-ring motors, depending upon the application. When the electrical equipment was installed, the power supply, taken from an older plant, was 66⅔ cycles. As it was known that eventually power would be supplied at 60 cycles, the coils of the magnetic contactors were wound for 60 cycles, with a tap provided for operation at 66⅔ cycles, and the change in power required only the change in tap on each coil.

Practically all the motors are handled by contactor-type control mounted on panels to form switch boards, which are housed in concrete buildings on the lock walls. These buildings also house the motors, operating machinery and the operating crew.

The principal part of the electrical equipment is represented by the motors and controllers used for driving the mitering gates of the locks and the valves which control the movement of water in and out of the lock chambers. Selection of these motors was closely connected with the economics of the canal. It was realized in the design studies that movement of traffic would be stimulated by the provision of a channel that would handle the largest vessels on the Great Lakes, and that speed in handling vessels through the locks would be essential.

FIG. 3—THE BOOMS of two wire-rope gate fenders, in open position, are shown on the wall at the right. The electrically controlled operating system is so interlocked as to require the fender to be closed until the gate is ready to be opened.



Eight-hour passage

The goal set for the designers was a maximum time of eight hours from Port Colburn on Lake Erie to Port Weller on Lake Ontario, instead of the eighteen hours then required. With eight locks in the 25-mile inland voyage, the requirement for filling one lock became 8 min. A single lock is 820 ft. long and 80 ft. wide. To handle this immense volume of water required for filling, in this time, four intake valves and four exhaust valves were provided for each single lock, each valve handling an opening 15x7 ft., being driven by a 12-hp. squirrel-cage induction motor.

While valves can be handled at constant speed with "cross-the-line" motors, the slip-ring motors on the gates are provided with control which furnishes one step of current limit acceleration. This control is arranged to allow a small step of resistance to remain in the secondary circuit of the motor as "permanent slip" resistor. What this means is that the motor is thereby given a drooping characteristic, which it does not possess inherently. This is desirable because the load varies with wind and with the water level. If a lock gate builds up retarding torque as it is being moved, the driving motor slows down and automatically develops more torque to handle the gate at reduced speed. When the load diminishes, the gate motor automatically speeds up. Thus, in the case of the gate motors, the straight characteristics of the motor are modified by the control to give better operating performance. In another application on the canal it was possible to modify the motor performance to advantage. On the gates more torque was desirable at reduced speeds.

The capstans are equipped with duplicates of the gate motors. It was felt, however, that the full torque available would be in excess of that desired for the capstan equipment. Therefore, in addition to the conventional secondary-resistor speed-regulating control supplied for the capstans, there was added

a permanent step of primary resistor to limit the maximum torque to the desired value. This control feature permits the use of duplicate slip-ring motors on the gate leaves and capstans, on dissimilar loads.

The gates and valves are relatively slow-moving but require accurate handling to insure proper positioning. The operating machine for each valve is equipped with a geared limit switch and a magnetic brake (of the torque-motor type). These are shown installed on a valve machine in Fig. 2. The same limit-switch element is built into a watertight form of housing for connection to the lock gates. These are mounted on the lock wall and connected by push rod directly to the gate, near the pintle. The gate machine is equipped with a brake similar to the lock brake.

The elements in these switches are of the quick-make and quick-break type, designed for high sensitivity. In addition, due to the requirements of this type of equipment, these limit-switch elements are designed for early reset. What this means is that if a limit-switch element trips at the limit of travel of a miter gate leaf, for example, the switch recloses with the minimum of travel in the reverse direction, to be again available for motion in the original direction. This is important on a lock gate when it is being handled near the limiting position during the closing movement.

All gates and valves are handled by remote-control masters on the operator's benchboard, but there is, in addition, an operating master switch on each control panel which takes precedence over the benchboard master. A number of the limit switches carry additional contacts, which are used for position-indicating.

Safety provisions

In view of the extremely high lift of the locks, previously mentioned, it is of the utmost importance that no damage be caused to the gates by impact from the craft being locked through. It can easily be seen that the failure of a gate through collision, if not foreseen and planned for, could cause a wave which would damage downstream locks and shipping. Should such a wave occur, pools which are provided in the channel would dissipate the wave action. Pool levels are regulated automatically by stoney gates under the control of float switches. These stoney gates are located on the regulating weir of each pool and are motor-driven. In addition, there is a hydraulic-turbine emergency drive. Float-switch action is relayed automatically to the weir.

The more important safeguards, however, are in the direction of preventing improper operation and accident. The gates and valves are completely interlocked so that operation is possible only in the proper sequence. This sequence includes guard gates where provided and the safety fenders installed at each lock. One of these fenders is shown in Fig. 3. The steel boom is simply a carrier for a large steel cable equipped with an eye which, when lowered to a horizontal position, is secured on the far wall by a motor-driven locking pin. The interlocking system requires that this boom and pin be in position before the next move in sequence can be initiated. A moving vessel would quickly crush the boom but would be gradually brought to rest by the controlled playing out of the steel cable.

While many craft are able to lock through the Welland Canal under their own power, occasions arise where it is advisable to handle them by auxiliary power. For this purpose 34 motor-driven capstans are provided, controlled manually by drum controls. These drums, each equipped with a power-circuit disconnector, are housed in an operating structure.

The canal was built by the Canadian Department of Railways and Canals. Work was begun under J. L. Weller and was completed under Alex J. Grant as engineer in charge. Frank E. Sterns was designing engineer, J. B. McAndrew mechanical engineer, and A. L. Mudge electrical engineer on the work here described.

An Engineer in Wonderland:

The PWA Washington Office

"HOW do you like our big picture? Did you ever see blue corn, or a blue wheat field before? It is quite a wonderful painting, isn't it?"

I turned and found that the inquiry came from the blond lady, one of a reception committee of two which greets all visitors who come to interview the colonels, majors, captains, lieutenants, professors, doctors and Mr.'s of the PWA in the Interior Department in Washington. The other member of the reception committee is a slim dark girl. Both have delightful Southern drawls and both fulfill the duty perfectly of amusing those who are waiting to talk to the gentleman whom they came to Washington to see. The conversation always seems to open with a remark about the large painting of an irrigated area at the foot of the slopes of the Rockies with blue shadows dominating the scene, which nearly covers one wall of the reception room.

When I arrived there a few minutes before, the blond lady, in reply to my question as to whether or not I could see Colonel W., told me that he was in California today but would be back in Washing tomorrow and that Colonel C. was in Texas this morning but would be in his office tomorrow morning. "You see, Colonel W. and Colonel C. always travel by air because their time is so valuable that we can't afford to waste a minute of it."

I then inquired for a friend of mine, who is employed in the engineering department, as I thought perhaps I could put my problem before him and find out whom I should see in the absence of Colonels W. and C. I addressed my inquiry to the brunette member of the reception committee and, after examining her list of employees, as of that morning, she finally found my professor friend's name and gave me his room number; four floors below and a mile and a half away through the corridors. I was a little astonished that she had to examine the printed list of the employees to find my friend, as he has been at the head of engineering departments in two large universities and I supposed that he was holding down an important post in the PWA. I indicated my surprise, but she laughed and said, "We have so many important people here working for us in the PWA in quite subordinate positions that it is very easy for us not to know them all."

I finally started through the hot corridors to see my professor friend and found him tucked away in a room with three or four other people in the engineering department. I told him my problem—i.e. how to find out how to find out who knows where to go to get information as to why the request for an increased grant for the Borough of S. had not been approved. This project was the first to be approved in my state and the first to be built of any consequence. While it was in process of construction the method of figuring the 30 per cent grant had been changed, making it much more liberal to the applicant so that, by the new method of figuring, the Borough of S. would get about 20 per cent more grant; but the application for this increased grant had been waiting somewhere in the PWA offices at Washington since the early part of February, nearly six months, without any definite determination. I knew that delays were necessary but thought that a reasonable amount of delay had certainly expired; hence my visit to Washington.

My professor friend, when I put this inquiry to him, consulted his printed list of employees, as of that morning, and finally told me that he was pretty sure that the person to start with ought to be the "expeditor," Lieut. L. Being an en-

gineer, my professor friend took out a large sheet of paper and drew a sketch of the fourth floor of the PWA offices labeling the various corridors and showed me where, about three-quarters of a mile away, the office of Lieut L. was situated. With this sketch I departed, and, following it accurately, I arrived, in due course, at Lieut. L.'s office, told him my story, saw him examine the list of employees, as of that morning, saw him take his telephone and start to work energetically to run down the fox to his lair. After calling two or three different officials, and holding long conversations with them, he finally turned triumphantly to me and said, "Your matter is being held by the director of engineering, because it is a matter of policy, which has to be decided, and he is the one to decide it."

While this was going on I had been sitting with the bright July Washington sunlight of 3 o'clock in the afternoon pouring in on my back while the perspiration poured out of me at every pore. I didn't dare interrupt the "expeditor" in his telephone calls, because I was afraid he might lose the sequence of events, so that the awning, which should have been shielding me from the sun's rays, remained raised. Finally, following his triumphant explanation of the situation, I asked him if it would be possible to eliminate the hot sunlight from my back by having the awning lowered. He turned to his assistant and in true naval parlance instructed him to "Lower away the halyards and drop the staysail," indicating the awning. We then, in much more comfort, discussed the next step for me to take, which turned out to be a call upon the director of engineering, whose office was about a half mile away in the main corridor of the building and was easily found by the large sign above his door.

I went into the waiting room of the director of engineering and found no one there, so sat down, watching the current of traffic flowing back and forth along the corridor. I noticed very soon a surprisingly interesting thing about this traffic—all that was hatless and coatless moved with a slow and measured tread, while those who were hatted and coated, evidently from out of town or from out of this office, moved with much more rapid cadence. Possibly this is due to the continued heat of Washington, which has taught the inhabitants to conserve their energies, or more probably it is due to the weight of important matters borne upon the shoulders of PWA'ers.

Pretty soon a young lady came and sat down behind a typewriter in the room which I occupied, above the door of which it stated that this was the office of the director of engineering. I inquired for this gentleman, but she said she worked for the legal department and therefore didn't know whether he was in or not, but she did offer or go to see his secretary for me, which she did. This shortly resulted in my having a talk with the very delightful and intelligent director of engineering. He knew just where everything was, and, after pressing a few buttons, had the whole matter before us on his desk.

It was just four hours from the time I started this expedition of discovery until I had completed my discussion with the director of engineering. Of that time at least 1½ hours had been occupied in waiting in various offices, at least an hour had been consumed in walking about the corridors from room to room, another hour in inquiring of various officials whom I should see to find out how to go about my problem, and the short period of a half hour was occupied by a most satisfactory discussion with the gentleman who knew all about it.

It turned out that a contract had been signed by the Borough of S. and the PWA by which the borough agreed to accept a grant of so much money. This was in November, 1933. If that contract had been signed two weeks later, the Borough of S. would have received 20 per cent more money, but it wasn't, and a contract is a contract. The director of engineering expressed his regret about the way the matter stood and said that he would like very much to have the Borough of S. obtain the additional grant, as he felt they deserved it, having been a pioneer in the PWA work in its state; but a contract being a contract, he was afraid that Mr. McCarl, Comptroller-General of the U. S. Treasury, would not approve of any change. I mildly suggested that if both of the parties were willing to change it, any contract could be changed legally, and I asked him if I might not be allowed to submit a brief on this subject, which he graciously permitted, but indicated that his fear of Mr. McCarl was great.

After properly showing my appreciation of his interest in this small matter I departed to wend my way to my automobile, but when I emerged from the building I found that I had turned so many corners inside the building that my sense of direction had entirely departed, and that I had no idea in the world, much less in Washington, in what direction my car was parked. I had to walk around the outside of this tremendous building until I found the place at which I entered originally four hours before. Standing in this position, it was then possible to retrace my steps to my parked car.

I drove home with Major G., chief engineer of the PWA office in my state, and found him greatly excited because he had discovered that the Washington office was closing at 3:30 during July and August. "They write us orders and changes and directions of all kinds every day, but they haven't told us a word about this 3:30 closing business," the major said. Probably someone forgot to get up an order on that, just like the bigamist whose excuse was that the little matter of divorcing his first wife, before marrying the second, had in some way slipped his mind.

It is all right for Colonel W. to fly to and from San Francisco, particularly during this terribly hot weather. It is fine in the air these days, but it would be awfully nice, when he does come hurrying back if he would help get my little matter, which has sat in the PWA for six months without action being taken on it, decided one way or another. It's PWA Docket No. 740, colonel, and the director of the bureau of engineering knows all about it and would like to give us the money. Put it up to Mr. McCarl with my brief attached and this story too, and see what he says . . . .—F. G.

To Regulate Billboards and Signs Along Long Island Parkways

THE Long Island State Park Commission has officially adopted for the Long Island region the regulations prepared by the State Council of Parks prohibiting the erection or maintenance of advertising signs, structures and devices within 500 ft. of state parks and parkways except under written permit from the regional state park commission of the region in which the park or parkway is located. Permits are not required for the name plates of professional people, such as engineers, architects, doctors, dentists or lawyers or the name plates of practitioners of customary home occupations, provided these signs are of a reasonable size and do not contain advertising matter. The State Council considers 12x24 in. a reasonable size for such name plates. Permits are not required for danger or warning signs, or for necessary direction signs, provided these signs are built to proper size and shape.

Under the regulations, permits may be issued for real estate signs that advertise the sale or letting only of the premises on which they are located, if such signs are not larger than 18x24 in. face on a marginal or side street and are at least 100 ft. from the boundary line of the park or parkway. Permits may also be obtained for any kind of an advertising sign that is not larger than 6x10 ft., fronting on a business street, provided the sign is completely screened from the park or parkway by woods or buildings.

Four Comparable Buildings Reveal Trend of Costs Since 1928

Wide variations in costs and specifications found in analyzing similar university classroom units built during the last seven years—Cubic-foot costs on present construction are 40 per cent lower than those of 1928 despite more elaborate finishing

By F. J. Knox
New York City

A COMPARISON of four similar university classroom buildings built in the mid-Atlantic section during the seven-year period of 1928 to 1934, both inclusive, shows a marked price trend downwards. Starting with the oldest, these four units have been designated as Buildings Nos. 1, 2, 3 and 4. An elaborately finished structure (Building No. 4), now under construction, cost 40 per cent less per cubic foot than a much more simply finished building (No. 1) erected in 1928-29. The four buildings have similar structural features, two- or three-story bearing walls with interior steel frames, and wood or steel roof trusses, but they vary in planning and general specifications. All buildings are designed for the same purpose and include no unusual features of construction. Buildings Nos. 2, 3 and 4 reflect the range of specifications available on the basis of present-day construction costs. Comparing Building No. 1 with the other three shows the decline in cost in the various specifications since the boom era. The high-cost Building No. 1 averages 68.68c. per cubic foot, and was completed in 1929. The low-cost Building No. 3 was completed in 1934 at a cubic-foot cost of 31.32c. Building No. 4, now under construction, has an estimated cube cost of 40.65c., and includes high-class finishes not contained in the other three buildings.

On a direct-cost basis the high-low percentage ratio is 210, with an average cubic-foot cost of 43.61c., most nearly approached by Building No. 4. The accompanying sketches and schedule of finishes show those features of planning and specification that bring about the analyzed variations in the cube costs.

In Table 1 is shown a detailed analysis of the cost of various items of specification on each of the four buildings and a composite building, summarized in five major classifications. The schedule of finishes, shown in Table 2, includes the structural features, foundation conditions, and a floor-by-floor comparison of finishes in the lobbies, corridors, class and lecture rooms, libraries, exhibit and general-purpose rooms.

Structural features

The four buildings are of high-grade fireproof construction. Buildings Nos. 1 and 4 cost the most per cubic foot for the distinctly structural features, as shown in Table I, Class I. Allowing for a 14 per cent decline in building costs since 1929, the cost of Building No. 1 would then be 11.24c. per cubic foot, compared with that of 9.57c. for Building No. 4. Both have solid-brick exterior bearing walls, interior steel frames, 4- to 7-in. reinforced-concrete slabs, and trussed roofs. The all-steel roof construction with precast roof slabs adds to the cost of Building No. 4, as compared with the wood deck and wood rafters on Building No. 1. In each case the excavation conditions were similar, as were also the types of foundations.

The low costs of structural work and foundations, 6.30c., on Building No. 2

TABLE I—COST COMPARISON OF FOUR COMPARABLE UNIVERSITY BUILDINGS CONSTRUCTED 1928-1934

	Bldg. No. 1		Bldg. No. 2		Bldg. No. 3		Bldg. No. 4		Composite Building				
Period of Construction	1928–29 (10 Mos.)		1931–32 (1 Yr.)		1933–34 (7 Mos.)		1934 (Under Const.)		High	Low	Mean	Median	Per Cent High/Low
Type (all wall bearing, interior steel frame)	2 story, bas't., truss roof		2 story, bas't., truss roof		2 story, truss roof		3 story, bas't., truss roof						
Cubic-foot volumes	397,000		1,109,000		425,300		1,054,000		1,109,000	397,000	746,325	739,650	
Cost, cents per cu. ft.	68.68		33.81		31.32		40.65		68.68	31.32	43.61	37.23	210
	Cost		Cost		Cost		Cost		Per cent total cost				
I. Foundations, framework, concrete, cement work.	% Total	Per cu. ft., cents	% Total	Per cu. ft., cents	% Total	Per cu. ft., cents	% Total	Per cu. ft., cents					
Excavation, fdns, concrete, cement work	11.80	8.13	12.20	4.11	10.71	3.36	14.10	5.75	14.10	10.71	12.21	12.00	131
Str. and reinf. steel, misc. iron, stairs	7.40	5.09	6.46	2.19	3.51	1.09	9.40	3.82	9.40	3.51	6.69	6.93	267
Total—Class I	**19.20**	**13.22**	**18.66**	**6.30**	**14.22**	**4.45**	**23.50**	**9.57**	**23.50**	**14.22**	**18.90**	**18.93**	**165**
II. Exterior facias, roof coverings, interior partitions:													
Masonry, cut stone, damp proofing	21.40	14.77	17.90	6.05	15.85	4.96	21.15	8.56	21.40	15.85	19.07	19.53	135
Roofing, sheet metal, slate, flashings	2.20	1.43	3.46	1.17	4.45	1.39	2.00	.84	4.45	2.00	3.03	2.83	223
Total—Class II	**23.60**	**16.20**	**21.36**	**7.22**	**20.30**	**6.35**	**23.15**	**9.49**	**23.60**	**20.30**	**22.10**	**22.25**	**116**
III. Interior finishes and surfacing:													
Carpentry, millwork, sash, glass, flooring	16.90	11.67	15.40	5.20	13.60	4.26	6.83	2.77	16.90	6.83	13.19	14.50	247
Hardware, letter boxes, bronze work	.80	.54	.97	.33	1.00	.31	1.41	.56	1.41	.80	1.05	.99	175
Lathing, plastering, soundproofing	4.20	2.90	6.25	2.12	5.05	1.58	4.83	1.97	6.25	4.20	5.08	4.91	148
Marble, tile, terrazzo, Kompolite, rubber, linoleum	4.60	3.13	2.59	.87	5.56	1.74	4.30	1.74	5.56	2.59	4.26	4.45	215
Doors—hollow metal, Kalamein, tin clad	.30	.22	2.34	.79	.28	.09	1.10	.46	2.34	.28	1.00	.70	834
Painting and decorating	2.20	1.50	.96	.33	2.47	.77	2.29	.93	2.47	.96	1.98	2.25	257
Total—Class III	**29.00**	**19.96**	**28.51**	**9.64**	**27.96**	**8.75**	**20.75**	**8.43**	**29.00**	**20.76**	**26.56**	**28.23**	**140**
IV. Mechanical, electrical and elevators:													
Electrical installation and fixtures	4.20	2.81	4.90	1.66	4.65	1.46	5.80	2.36	5.80	4.20	4.89	4.78	138
Plumbing	1.10	.79	3.28	1.11	3.40	1.06	9.90	4.03	12.06	7.70	10.41	10.94	157
Heating and ventilating	6.60	4.55	8.70	2.95	8.66	2.71	(a)	(a)	(a)	(a)	(a)	(a)	(a)
Elevators, dumbwaiters	1.40	1.04	.59	.20	.....	.....	.77	.30	1.40	.....	.69	.68	...
Total—Class IV	**13.30**	**9.19**	**17.47**	**5.92**	**16.71**	**5.23**	**16.47**	**6.69**	**17.47**	**13.30**	**15.99**	**16.59**	**131**
V. Equipment and misc.													
Equipment, furnishings, walks and pavements, landscaping	.80	.46	.80	.27	5.13	1.63	3.37	1.36	5.13	.80	2.53	2.08	641
General, bond, fee, misc.	14.10	9.65	13.20	4.46	15.68	4.91	12.75	5.20	15.68	12.75	13.92	13.65	123
Total—Class V	**14.90**	**10.11**	**14.00**	**4.73**	**20.81**	**6.54**	**16.12**	**6.56**	**20.81**	**14.00**	**16.45**	**15.51**	**149**
Total—All Classes	**100.00**	**68.68**	**100.00**	**33.81**	**100.00**	**31.32**	**100.00**	**40.65**	.....	.....	**100.00**	.....	...

(a) Included with plumbing.

TABLE II—STRUCTURAL FEATURES AND SCHEDULE OF FINISHES

	Bldg. No. 1	Bldg. No. 2	Bldg. No. 3	Bldg. No. 4
Exterior and Foundations				
Excavation	Mixed sand clay.	Mixed earth and shale	Clay.	Mixed sand and clay.
Foundations and walls	Spread footings, 20-in. fdn. wall.	Spread footings, 21-in. fdn. wall.	Spread footings, 18-in. fdn. wall.	Spread footings, 21-in. fdn. wall.
Exterior walls, brick	Selected Lebanon, Flemish bond.	Oversize Va. hand made, Flemish bond.	York, Pa., Flemish bond.	Selected face, Flemish bond.
Exterior walls, cut stone	Granite grass course. Misc. limestone door and window trim.	Limestone to 1st. floor. Misc. door and window trim.	Granite grass course. Misc. limestone door and window trim.	Granite grass course and misc. trim. Limestone corners, cornice and misc. trim.
Exterior millwork	Cornice. Palladium windows. Architraves.	Cornice. Main entrance trim.	Cornice. Architraves.	In cut stone.
Roofing	Copper roof. Wood rafters. Steel truss. Skylights.	Slate. Louvered dormers. Cast stone coping.	Slate. Lecture hall, tar and gravel.	Slate. Cupola. Skylight. Flood lights.
Structural details	Solid brick ext. bearing walls. 4-in tile partitions. Interior steel frame. 4½-in. reinf. slabs. Comb. bucks with trim. Stud partitions on 2nd. floor.	Bearing walls and partitions. Bar joists. 2½-in. conc. slabs with lath. Steel and wood trusses. Wood frame roof. Exterior walls 8-in. load-bearing tile and 4-in. face brick. 8-in. load-bearing cinder-block partitions. Comb. bucks with trim.	Bearing walls and partitions. 4½-in. conc. slab. Interior steel frame. Steel and wood trusses. Slate deck. Suspended 2nd. floor ceilings. Comb. buck with trim.	17-in. solid brick bearing wall. Precast roof slab. Slate. Steel truss. 4-in. to 7-in. reinf. slabs. Interior steel frame. Comb. bucks with trim. Wood window casings on all plaster walls.
Interior				
Basement and Ground Floor General	Hardwall plaster, painted. Suspended ceiling.	Hardwall plaster, painted. Suspended. ceiling.	Cement plaster.	Hardwall plaster, painted. Susp. ceiling
Vestibules and corridors	Slate base. Kompolite floor.	Mastic floor. Wood base.	.....	Terrazzo floor. Slate base. Tile wainscot.
Toilets	Ceramic tile floors and wainscot.	Ceramic tile floors and wainscot.	Ceramic tile floors and wainscot.	Ceramic tile floors and wainscot.
Class rooms and offices	Kompolite floor and 6-in base. Stained and varnished 4-in. chair rail. Smooth pl. wainscot. Corkboard walls in classrooms.	Mastic floor. Wood base. 4-in. chair rail stained and varnished.		
Locker and misc. space	Kompolite floor and base. Rough plaster.	Mastic floor and cement base. Rough plaster.	Cement floor and base. Cement plaster.	Cement floor and base. Brick walls. Tile wainscot.
First Floor General	Hardwall plaster, painted. Suspended ceiling	Hardwall plaster, painted. Suspended ceiling.	Hardwall plaster, painted. Suspended ceiling	Hardwall plaster, painted. Suspended ceiling.
Main lobby	Rubber tile floor and base. Picture molding. Wood architraves and pilasters.	Wood floor and base. Cement plaster dado. Wood cornice and pilasters.	Mastic floor. Rubber base. Plaster molding.	Terrazzo floor. Marble base and 4 ft. 9 in. wainscot. Plaster molding.
Vestibules, corridors, stairs, passages	Plaster soffit at stairs. Slate treads. Rubber tile floor and base. Cloth on plaster.	Rubber floor. Wood base. Cement dado. Plaster cove and molding.	Flagstone floor. Brick base. Stucco walls. Bluestone stair treads.	Terrazzo floor. Slate base. 4-in. tile wainscot. Plaster panels.
Office and classrooms	Comp. floor. Wood base. Cloth on plaster. 4-in. chair rail.	Mastic floor wood base, chair rail and picture molding.	Mastic floor. Wood base and chair rail.	Wood floor, base and chair rail. 33-in. wood wainscot in lecture hall.
Libraries	Ceiling high shelves. Wood mantle slate hearth. Curved ceiling.	Rubber floor. Wood base. Book shelves to ceiling.	Mastic floor. Wood base. Book cases to ceiling. Wood trim arches and pilasters.	
S.S. Closets	Ceramic tile floor. Cement plaster wainscot.	Ceramic tile floor. Cement plaster wainscot.	Ceramic tile floor. Cement plaster wainscot.	Ceramic tile floor. Cement plaster wainscot.
Second Floor General	Hardwall plaster, painted. Suspended ceiling.	Hardwall plaster, painted. Suspended ceiling.		Hardwall plaster, painted. Supended ceiling.
Lobbies, corridors, stairs passages	Rubber tile floor and base. Plaster molds. Bronze grilles. Wood plaster trim.	Mastic floor. Painted wood base. Cement dado. 8-in. plaster cornice. Chair rail.		Terrazzo floor. Slate base. Tile wainscot.
Offices and classrooms		Mastic floor. Wood base. Sand finish plaster. Hardwall plaster dado. Chair rail. Wood window casings.		Wood floor, base, chair rail and molding. Metal counters and filing cabinets.
Libraries		Mastic tile floor. Wood base. Low bookcases. Picture molding.		Wood floor and base. Built-in shelves in reading room.
Exhibit rooms and galleries	1½-in. boarding. Coved ceilings. Skylights. Sanitas cloth. Monk's cloth on walls. Wood floor and base.	Mastic tile floor. Wood base. Smooth boarding. Scratch brown coat plaster with burlap. Wood column and pilaster trim. Sound insulated. Plaster cove and molding.		
Toilets and toilet vestibules		Ceramic tile floor. Tile wainscot.		Ceramic tile floor. Tile wainscot.
Kitchen		Linoleum floor. Wood base. Kitchen equipment.		
Third Floor or Attic General	Unfinished.	Unfinished.	Unfinished.	Hardwall plaster, painted. Suspended ceiling.
Landings, toilets, corridors				Terrazzo floor. Slate base. Tile wainscot.

TABLE II (CONTINUED)—STRUCTURAL FEATURES AND SCHEDULE OF FINISHES

	Bldg. No. 1	Bldg. No. 2	Bldg. No. 3	Bldg. No. 4
Rest rooms				Mastic tile floor. Wood base, chair rail, picture molding.
Classrooms				Wood floor, base, chair rail, picture molding.
Auditorium, stage and organ loft		Wood floor and sleepers. Wood base. Sound finish plaster. Painted acoustic plaster ceiling. Molded cornice and architraves. Panelled wood wainscot on stage and unfinished ceiling. Cement floor and base, cement finish plaster on walls and ceilings and iron shutters in projection and dressing rooms.	Mastic floor. Wood base and chair rail. Paladium windows. Platform with blackboard. Plaster cornice. Hard-wall painted plaster.	

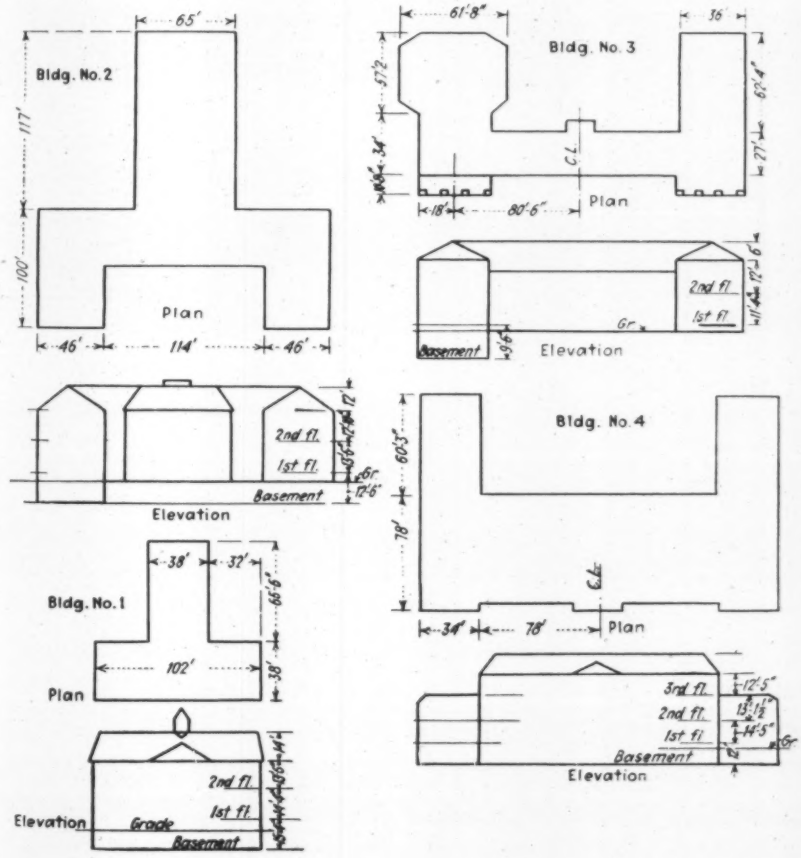
and 4.45c. on Building No. 3, are due to reduced basement area in Building No. 3 and to simpler design in Building No. 2. Building No. 3 has basement space for toilets and storage only, under the left wing section (see sketch), extending 9 ft. 6 in. beneath the first-floor grade to basement floor finish, and the average depth of the remaining footings is approximately 4 ft. below the first-floor grade. Building No. 2 is constructed with Kalman bar joists supported on exterior walls of 8-in. load-bearing tile and 8-in. load-bearing cinder-block interior partitions. The floor slabs are of 2½-in. concrete reinforced with wire lath. Also, steel trusses are confined to the auditorium section in the rear, the remainder being of wood. On Building No. 3 the trusses are all steel in the rectangular areas, with a flat roof construction over the octagonal rear section.

Masonry, cut stone and roofing

The extent to which cut stone is used largely determines the fluctuations in the masonry costs. For this work, shown in Class II of Table I, Buildings Nos. 1 and 4 are highest in cost, 14.77 and 8.56c., respectively. Building No. 2 is next with 6.05c. per cubic foot, and the lowest is found in Building No. 3, 4.96c. In all cases the face brick is selected local stock, except in Building No. 2, where an oversize Virginia handmade brick was used, increasing the cost on account of freight and selection. On Buildings Nos. 1 and 3, the cut stone consisted of granite grass course with miscellaneous limestone trim at first-floor windows and at the doors. Building No. 2 bulks larger in cost than No. 3, owing to limestone courses running to the first-floor level, and because of cast-stone copings. Building No. 4 also has a granite grass course and miscellaneous limestone window trim. In addition, the main entrance architraves are trimmed in granite, and limestone corner courses occur at all building angles, running to the roof cornice, which is also of limestone.

Interior partitions consist of 4-in. terra cotta in all buildings, but Building No. 2 also has 8-in. load-bearing cinder block. Stud partitions are erected in the gallery spaces in Building No. 1, to facilitate application of boarding and nailing strips. Building No. 4 has a considerable area of solid-brick partition in the basement section. Buildings 2, 3 and 4 have slate roofs, and No. 1 has a copper-covered wood deck. On a cubic-foot basis, Nos. 1 and 3 are comparable in cost, 1.43 and 1.39c., respectively. The lowest cost is for No. 4, 0.84c., which provides for a slate roof applied on a precast concrete slab. Skylights are included only for buildings Nos. 1 and 4, with louvered dormers on Building No. 2.

PLAN AND ELEVATION SKETCHES of the four university classroom buildings analyzed for cost comparisons.



Interior finishes and surfacing

The total cost of carpentry, millwork, plastering, painting, glazing, marble, tile, terrazzo and all types of floor surfacing approximated $81,826 on Building No. 1, while on No. 4, $84,955 is being spent for similar work of a much more costly type, and in a building 2.7 times larger than No. 1. For all buildings, interior finishes on No. 1 cost the most, 19.96c., and on No. 4 the least, 8.43c., on a cubic foot basis. The general finish of No. 1 consists of Kompolite floors and slate base, with rubber tile floors and base in the corridors and public spaces. Plain plaster walls with

chair rail and picture mold in classrooms and offices, with ornamental wood pilasters and architraves in the lobbies is the extent of the wall treatment. Building No. 4 has terrazzo floors and a slate base, with 4-ft. 9-in. tile wainscots in all corridors and public spaces, combined with maple block floors, wood base and chair rail in the classrooms and offices.

The lobbies have ornamental plaster ceilings and 4-ft. 9-in. marble wainscots. All buildings have wood window casings on all plaster walls, and combination metal bucks with applied trim. Buildings Nos. 2 and 3 have mastic floors, wood base, chair rail and picture molding in classrooms and office spaces. The corridor spaces of No. 2 have Keene's cement dadoes, with wood cornice and pilaster trim in the lobbies. Building No. 3 corridor has a flagstone floor, brick base and stucco walls. The lobby spaces have mastic floors, rubber base and plaster molding.

The libraries in all buildings are of simple design. Buildings Nos. 1, 2 and 3 have bookcases running to the ceilings in parallels, with arched ceilings between the cases. The reading room of No. 4 has built-in shelves. Building No. 1 library also has a wood mantle with slate hearth. A detailed description of gallery, exhibit rooms, lecture and auditorium spaces is given in Table II.

Mechanical trades and elevators

Building No. 3 is the lowest in cost for this work at 5.23c. per cubic foot, with Nos. 1 and 4 the highest, ranging from 6.69 to 9.19c. The work in all buildings is similar as to specification, with central heat provided through pipe tunnels. The plumbing and heating on No. 1 cost $21,196, and on No. 3 the cost was $15,320. Buildings Nos. 2 and 4, of comparable cube, cost respectively $43,855 and $41,000. Electrical installation and fixtures totaled $11,415 on No. 1; $18,469 on No. 2; $5,898 on No. 3; and $24,000 on No. 4. There is no elevator installation in Building No. 3, but the contract prices for Buildings Nos. 1, 2 and 4 are, respectively, $4,113, $2,200 and $3,200.

Equipment and miscellaneous

Seats, cabinets, miscellaneous furnishings, auditorium equipment, landscaping, general conditions, bond and fee are lowest in cost in Building No. 2 and highest in No. 1. On a percentage basis, No. 3 is highest at 20.81 per cent, and No. 2 is lowest at 14.00 per cent. Building No. 4, now under construction, is closest to the average at 16.12 per cent. As all equipment for this type of building is standardized, variations in the cost of this class of work depend upon construction hazard, winter conditions and those elements not entirely under the builder's control.

Notes on Vibrated Concrete for a Dutch Bridge

Outline of observations and control tests conducted in constructing a road bridge of vibrated concrete for a state road in Holland

By H. A. M. C. Dibbits
Department State Road and Canal Construction, Wassenaar, Holland.

IN CONSTRUCTING a grade separation on the state road between Amsterdam, Bodegraven and Rotterdam in Holland in 1933, the opportunity was taken to experiment with vibration in placing the bridge concrete. Observations were made on displacement of reinforcement, construction of forms, deposition, consistency, density and strength of concrete and on general construction procedure, using outside vibrators acting on the forms. Some of the determinations were made on the bridge structure, and others on cubes of concrete molded by vibration. In general, the cube tests related to consistency, density and strength.

Observations on bridge

The bridge, as shown by Figs. 1 and 2, was a simple structure consisting of a number of parallel column-and-beam bents carrying abutment face and wing-walls and a floor slab at the upper level; the lower-level floor slab was independently supported. The bents, floors and walls were heavily reinforced, as indi-

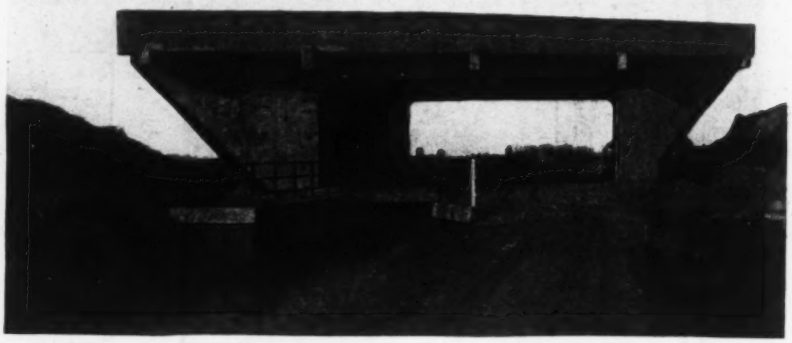


FIG. 1—ROAD BRIDGE of vibrated reinforced concrete on the state road between Amsterdam and Rotterdam in Holland.

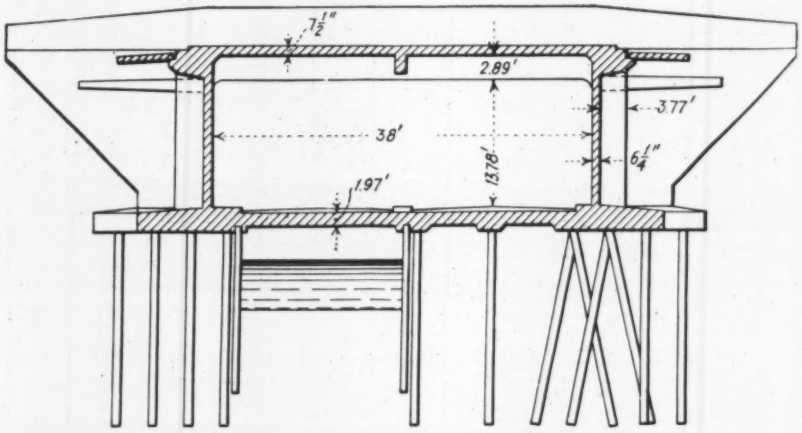


FIG. 2—SECTION OF DUTCH ROAD BRIDGE, showing concrete parts placed by vibration applied against the forms.

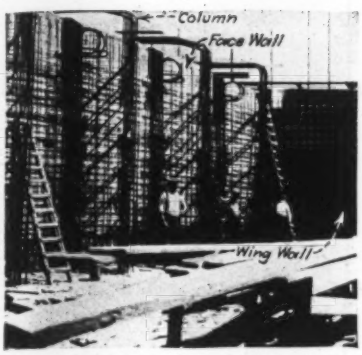


FIG. 3—REINFORCING NETWORK for columns and face wall of Dutch grade-separation structure.

cated by Figs. 3 and 4. The forms were of ordinary timber construction, and the reinforcement was held in place by usual methods. Vibration was employed in concreting walls, columns and upper-floor system.

Steel Displacement—In only a few instances in which it had been necessary to vibrate longer than usual was there any displacement of the reinforcement. In these instances the vibrators had caused the concrete to wedge between the form and the steel and bend in the reinforcement. To determine whether or not the reinforcement in a completed and settled part of the construction might be disengaged by the vibration of concrete being placed on top, a separate test was made.

A 12-in. cube provided with reinforcement bars set in it was molded by vibration; 18 hours later this cube was again vibrated for a long time. So far as could be judged, the second vibration caused no loss of bond between the concrete and the embedded bars. Inadvertently, it was discovered that after compaction, but while the concrete was green, any disturbance of the steel easily broke the bond, which was not afterwards recovered. In molding the cube a workman took hold of one of the rods to feel whether it was firmly set; the next day it was observed that, while all the other rods were firmly fixed, the one that had been disturbed was loose in the hardened concrete. Except in this one instance, no indication was found that lack of bond was necessarily to be feared where steel is embedded in vibrated dry concrete.

Form Construction—As stated, ordinary wood-form construction was employed; the vibrators were applied to the outside of the forms, as shown by Fig. 5. Each vibrator was fastened to a steel angle about 4 in. long, which was bolted to a strip of plank nailed to the form lagging. At first, trial was made of vibrators placed on the form studding, but, with the light (about 15½-lb.) French vibrators employed, effective action was not had on the concrete. It is believed that with the heavier (about 45-lb.) American vibrators, location on the studding would be preferable. If placed directly on the lagging, a cushioning plank is essential to distribute the vibratory action and to prevent the lagging from being beaten to pieces. As a construction convenience, it is recommended that the angle and plank connections be constructed with the forms so that only the vibrator need be shifted as the concreting proceeds.

In general, a stronger form construction is required for vibrated concrete. Tightness of the form is also more essential. Vibration increases the concrete pressure on the forms; in the Nov. 6, 1933, *Oesterreichische Bauzeitung* it is stated that a pressure of 7 lb. per sq.in. can be brought on forms by internal vibration.

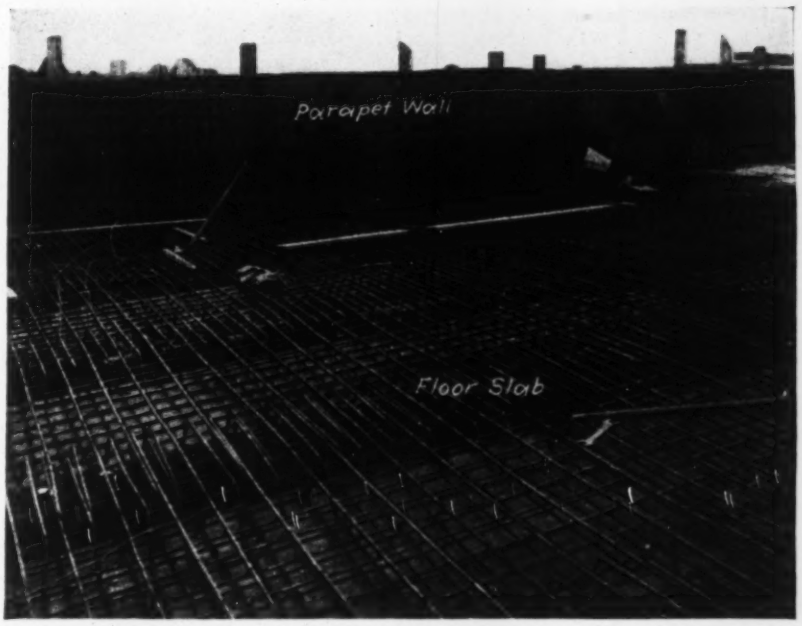
Placing Concrete—As an indication of practicable consistency of concrete, a 24-in. cube of no-slump (earth-moist) concrete was molded in a wood form by outside vibration. One minute of vibration gave a plastic mixture; the form was removed immediately after vibration. The cube (Fig. 6) showed no slump and no dimensional distortion with a man standing on it. This gave confidence that an earth-moist (no-slump) concrete could be placed, and work was started with this mixture.

The work called for (1) concreting inside of closed wall and column forms built full height and (2) concreting open beam and slab forms for the bridge deck. Columns and walls were monolithic, and in the closed forms the progress upward of the filling had to be checked carefully in order to control the amount of vibration. This was accomplished by lowering lights into the forms and observing when the dry mixture had reached plasticity and final compaction. On the beam and slab deck the condition of the concrete could always be seen, and the control of vibration was easy. In concreting the heavy transverse column caps at the ends of the floor deck the need of an internal vibrator was felt, and for the floor slab a platen-type vibrator would have given great service. The conclusions from experience that require emphasis are: (1) it is absolutely necessary that the concrete shall be open to observation during vibration; and (2) it is essential that several types of vibrators be available to meet the different conditions of placing.

A change of concrete consistency from the no-slump mixture of the trial cube (Fig. 6) was found necessary as the work progressed. The long vibration required to make the dry mix plastic was found to be loosening the forms.

FIG. 5—OUTSIDE VIBRATORS attached to wall-form lagging in Dutch bridge of vibrated concrete.

FIG. 4—FLOOR REINFORCEMENT mat for deck of bridge, concreted with a mix of 0.6-in. slump aided by external vibrators.



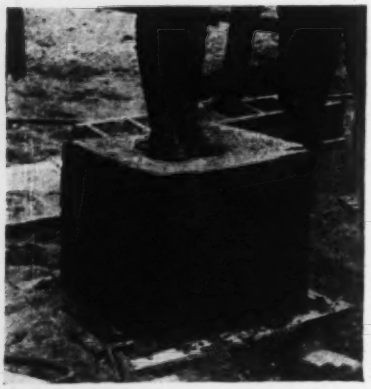


FIG. 6—VIBRATED CUBE of no-slump concrete; forms were removed immediately after vibration.

FIG. 7—HONEYCOMB in abutment face wall due to dry concrete hanging up on reinforcement.

A change was made to a concrete of 1½ cm. (0.6-in.) slump; it is considered that this consistency represents about the lowest degree of wetness that is practicable for concrete to be placed in forms.

Vibrating Technique — To secure highest efficiency in vibration, there must be an optimum ratio between the wetness of the concrete and the time period of vibration. This is influenced by the nature of the concrete, the placing conditions and the spacing of the reinforcement. The determination of the optimum ratio must be by trial. It is gravity alone that consolidates the concrete; the vibration merely decreases the internal friction of the mixed particles so that they will settle together more compactly. Gravity that moves the particles is constant, but the forces (internal friction of the concrete particles and friction with forms and reinforcement) which resist gravity are constantly changing.

A number of examples from the actual work throw light on vibrating technique. The honeycomb shown by Fig. 7 was found in one of the 6½-in. walls; it was about 2 in. deep and was on the side opposite that on which the vibrators were placed. The side next the vibrators showed solid concrete. The honeycomb was caused by the no-slump mixture being "hung up" on the reinforcement. After changing to the wetter (0.6-in. slump) mixture, no further honeycombing appeared. Fig. 8 shows the result of a spreading form; the white circles indicate the locations of the vibrators. After the lower part of the wall had set and another lift of concrete was added and vibrated, spreading of the forms allowed the fresh concrete to flow down and form a bulge or patch on the hardened wall below. More strongly braced forms would have prevented this mishap.

The surfaces of the wall where no vibrators were located show in a number of places shallow clefts; Fig. 9 is an enlargement of one of these faults. The explanation is presumed to be that after the concrete had been vibrated and set a short time, a vibrator below the location of the cleft was again put in operation; as a result, the concrete opposite the vibrator (because it had not been fully compacted at first or because the forms had sprung) settled further, while the concrete above and away from the influence of the vibrator "hung up" on the reinforcement.

Observations made during the work indicate that until concrete is in the form opposite the vibrator its operation will spring the form. It is also important to plan carefully the vibrator locations and to operate them according to a precise system. The men operating the vibrators should be skilled in their use. With proper precautions as indicated, a sound, smooth concrete was produced by vibration.

FIG. 8—CONCRETE DEPOSIT on wall due to spreading of forms by vibration.

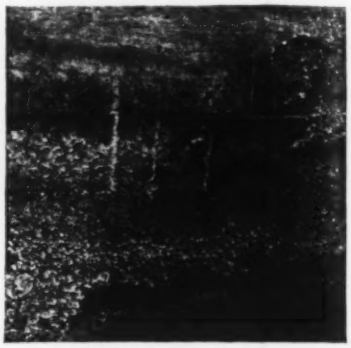


FIG. 9—CLEFT in wall face caused by poorly systematized vibrating schedule.

Cube-test observations

A number of density or solidity tests conducted to control construction gave the following strengths in kg. per sq.cm.:

Test	Slump 0	Slump 0	Slump 0.6 in.	Slump 6 in.
*1	....	314	269	....
*2	....	348	288	....
3	408	....	....	209
†4	415	....	....	213

*Average of three samples. †Average of two samples.

The cement volume was 360 kg. per cubic meter in these density tests. Compression tests on concrete of the same proportions were made on 10-cm. (4-in.) cubes cut from the cube shown by Fig. 6. These cubes were polished and dried; the strength, converted to the nearest English measure equivalent, averaged for nine samples was about 9,000 lb. per sq.in.

Conclusions

The question whether vibration will successfully take the place of the usual way of placement in reinforced-concrete construction must for the present be answered in the negative. The use of vibrators is recommended only with caution, and each case should be carefully studied before a decision is taken. It is absolutely necessary to make sure about the needed apparatus and machinery as well as the method of using them. In order to prevent too many difficulties in the placement of concrete in reinforced construction, by vibration, one should take care that the slump of the mortar amounts to at least 1-1.5 cm., and it should not be forgotten that such a mixture gives lower solidity figures than a very dry mixture. It should also be remembered that the placement of vibrated plastic concrete—for example with a slump of 15 cm.—certainly reduces the solidity in comparison to cases where such mixtures are not vibrated. As to the working methods, the writer wishes to draw attention to the following:

1. The forms require the utmost care; for the construction of walls a liberal use of form ties is recommended.

2. In vibration there is a very important relation between the water ratio of the mortar and the time of vibration. It is recommended that the concrete be visible during placement, in order to be able carefully to regulate the time of vibrating.

In vibrating, carefully treat the grooves and joints between different placements, or, still better, try to prevent them altogether.

4. Generally speaking, for the construction of important pieces of work, with the use of vibrators for placing the concrete, it will be necessary to have a collection of different types of vibrators at hand, viz., vibrators on the forms, pervibrators for internal vibration and surface vibrators.

Concrete Materials Handling for Norris Dam Construction

Rock to be quarried close to the dam for both stone and sand and delivered to the mixing plant by a belt-conveyor system—Bulk cement delivered by rail and truck

QUARRYING, crushing, screening, conveying and delivery of stone and sand to the central mixing plant at Norris Dam on the Clinch River in Tennessee has been laid out on a straight-line production basis that insures adequate capacity and wide flexibility in operation of the several units. The sand and stone are obtained from a deposit of dolomitic limestone immediately adjacent to the dam site. Cement is delivered in bulk to within 5 miles of the dam and is handled in bulk by truck to the plant at the dam site, where close to 1,000,000 cu.yd. of concrete must be mixed for the dam, power house and auxiliary structures. The output of this plant is transferred by rail to within range of the two cableways spanning the dam site.

In the selection of the plant and equipment that has been installed, provision was made for such flexibility of operations as reasonably varying conditions might require. Storage at various points in the line of production also will permit various units to continue running for a time in case it is desired to shut down sections of the production line ahead or behind them. On the whole, however, the general scheme is based on operation of all units six days a week on a 22-hour-a-day basis.

With the exception of air drills in the quarry, all the plant and equipment for the quarry, the crushed stone and sand plant, the concrete mixing plant and the cableways are motor-driven. Air also is supplied from a motor-driven compressor plant. Throughout the layout full advantage has been taken of the possibilities of motor drive and of close control of operations over a distance of nearly half a mile from the quarry to the adjacent end of the dam, which in itself is to have a crest width about 1,800 ft.

Located on the face of a steep side hill with a thin overburden of clay, the somewhat stratified deposit of dolomite at the site of the quarry is comparatively easy to drill for blasting. Drilling is done with a group of eight wagon drills, using drill steel in 30-ft. lengths. These same units were first employed in drilling for the excavation necessary to prepare the foundation of the dam. They have been found specially suited for the type of rock encountered. Much less difficulty is experienced in shifting them on the face of the quarry than would be the case with well drills. The wagon drills also permit much faster and more economical drilling than is possible under the local conditions with smaller types of somewhat more portability. For secondary drilling, however, some jackhammers are used.

As soon as the face of the quarry has been developed to its total length of 1,200 ft., to permit a regular sequence of operations, it is planned to work in 28-ft. lifts. Spacing of holes and methods of loading with the 40 per cent dynamite were still being experimented with at the time these notes were prepared. Plans are to drill and shoot a 200- to 300-ft. length of face at a time to reduce to a minimum interruptions of drilling and mucking.

Spoil from the blasting is loaded into 10-yd. dump trucks by the two 3-yd. electric shovels. These trucks and

FIG. 1—SITE OF NORRIS DAM on Clinch River, showing major elements of construction plant.

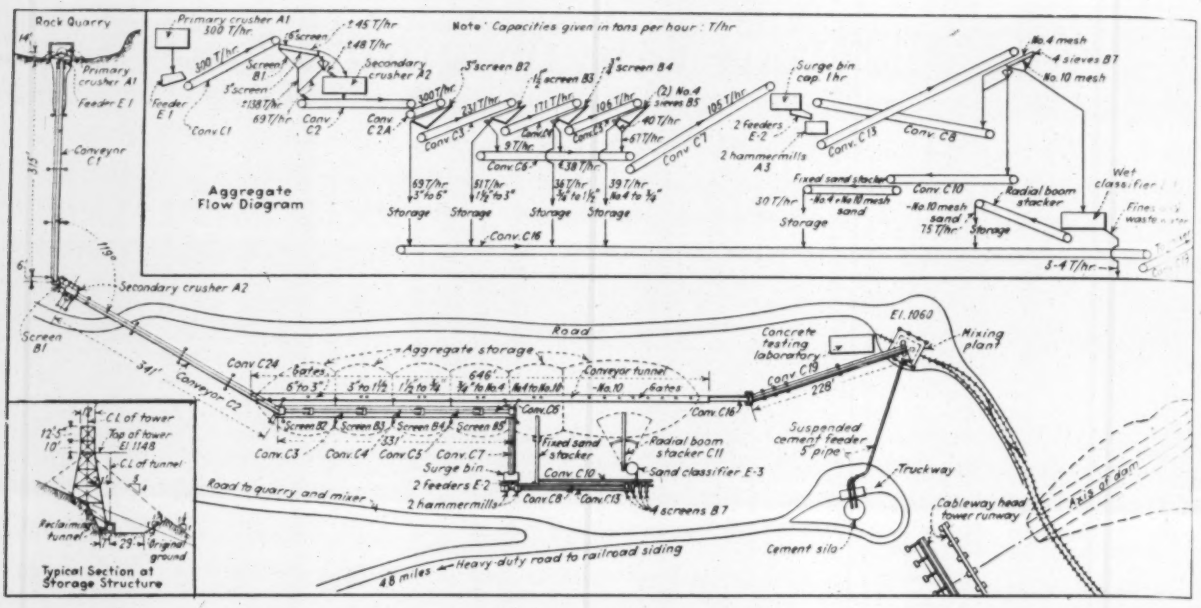


FIG. 2—ARRANGEMENT of the plant for handling stone, sand and cement is shown in this plan and diagram. Capacities of the several elements are shown on the diagrammatic flow sheet.

shovels were used previously in handling the 375,000 yd. of earth and rock that were removed in preparing the foundation for the east end of the main dam. Remarkably smooth, economical service was obtained from both shovels and no difficulties were experienced in handling the 2,300-volt portable cables that deliver energy to the shovel motors from adjacent transformers. In the quarry the conditions are about the same, with frequent blasting and with men moving around the shovels constantly. Shifting of the cables also is simple, requiring no special provisions and involving only routine work by common labor.

The haul from the shovels to the primary crusher at the quarry will not exceed 1,500 ft. and will average much less than that distance. Even with this short haul the decision was made to use motor trucks instead of any other type of transportation for delivery of spoil from the face of the quarry to the crusher. The trucks are the same six to 10-yd. capacity that gave satisfactory service under more difficult conditions, specially as to grades, in the excavation for the foundation of the main dam. There, running over the rough surfaces of the excavation and the temporary roads leading to the dumps, from 2½ to 3½ months' service was obtained with the various makes of tires with which these trucks were equipped. This was on the basis of normal operations 22 hours a day, six days a week.

Crushing and screening plant

Run-of-the-shovel output as delivered to the trucks is fed directly by the latter into a 42-in. gyratory crusher placed about at the lower end of the transverse center line of the quarry. On account of the steep side hill on which the quarry is located it was desirable to have the crusher occupy as little space as possible. This was accomplished by using a 17-part rope drive between the crusher and the 250-hp. motor that runs it. With this set-up, the floor space needed was reduced to 16x16 ft.

On the opposite side of the steep narrow draw in which the quarry and primary crusher are located, there are the secondary crusher, the crushed-rock sizing and storage plant and the equipment for producing sand. Leading from the primary crusher across this draw is a 36-in. belt conveyor, 330 ft. long, on an overhead steel structure that leads to the head tower, in which the secondary crusher is placed. It has a capacity of 300 tons per hour and is driven by a head pulley equipped to remove magnetically all tramp metal that may come from the quarry.

In Fig. 2 is shown diagrammatically the flow of aggregates from this conveyor to the mixing plant. First, a 6-in. vibrating scalping screen in the head tower of the secondary crusher delivers its rejects to the secondary crusher. The latter, which is a 5½-ft. short-head cone unit, is set to reduce the material fed to it to a maximum 3-in. size. Between the 6-in. vibrating scalping screen and the cone crusher is a 3-in. screen that also delivers its tailings either to that crusher or directly to the conveyor leading to the sizing and storage plant beyond. This arrangement permits control of the volume of smaller sizes produced as may be desired at the screening plant.

Output of the secondary crusher and the material passed around it all feeds to a 30-in. inclined conveyor leading up to an overhead structure containing a series of conveyors, screens and feeders by means of which the reduced quarry output is sorted into four sizes. First comes a 3- to 6-in. grading, then 1½ to 3-in., next ¾- to 1½-in., and finally 4-mesh to ¾-in. All four sizes are separately stockpiled over a 6x6-ft. concrete tunnel, 646 ft. long, in which a 30-in. belt conveyor provides means of reclaiming.

As shown by the flow sheet, any of the screens separating the three sizes from 3 in. down may be arranged to deliver to a horizontal conveyor in the overhead structure. This horizontal conveyor delivers in turn to an inclined conveyor leading to a surge bin in the sand-reducing plant. Ordinarily, the final screen in the overhead structure delivers to an inclined unit leading to the sand plant. But when more sand is needed than comes from this regular operation, then the provision for turning in all three or any one of the last three sizes regularly stockpiled takes care of the maximum needs.

The sand-producing plant

Two sizes of sand are produced by reduction of the stone delivered from the screening plant. The coarse grade is 4- to 10-mesh, while the finer is 10-mesh down, with the dust removed. Two 42x48-in. hammer mills are used for producing sand. This type of equipment was selected after extensive experiments, to determine comparative cement requirements, workability and the strength of concrete samples made with sand produced by various kinds of reducing equipment.

With the local stone the hammer mills turned out a product that was the most satisfactory, the sand being nearly cubical in shape and well graded.

One objection to hammer mills is the amount of dust they occasionally produce. Tests indicate that with the local

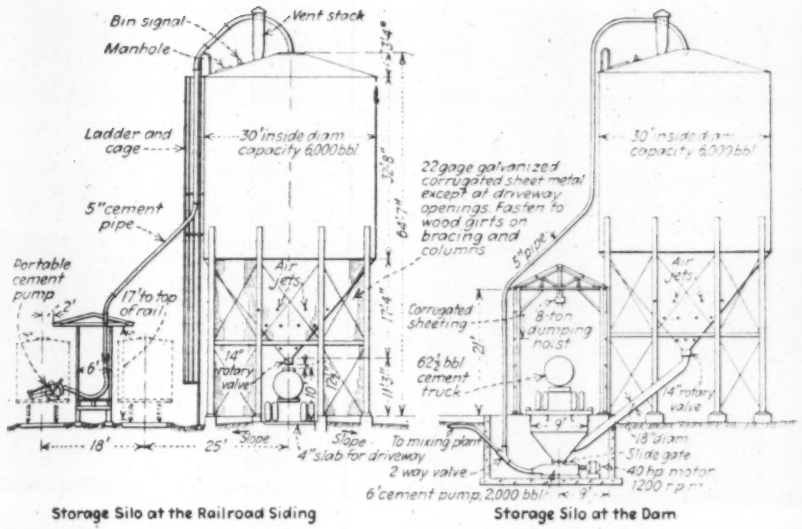


FIG. 3—SILOS FOR CEMENT STORAGE are located at the railroad siding and at the dam. At the left is shown the bulk-cement delivery plant at the siding, and at the right is the plant at the dam where cement can be delivered directly to the mixer or pumped to storage.

stone and the sizes of sand required the amount of dust that will have to be wasted will not exceed 4 per cent of the total run of the primary crusher of the plant. This dust will be wasted unless a market is found locally for it.

Output of the hammer mills of the sand plant is delivered to an inclined conveyor, which feeds four double-deck vibrating screens equipped with 4-mesh and 10-mesh cloth. Tailings from the 4-mesh screen are returned to the hammer mills for further reduction. Output of these screens, grading minus 4 to plus 10-mesh sand, is delivered by belt conveyor to a fixed sand stacker that piles over the reclaiming tunnel. The rest of the output of the screens goes either to a wet rotary classifier, or any part of the plus-ten product may be returned to the hammer mills for secondary breakage. In this manner close control is maintained over the gradation of the final product.

Fines and waste from the classifier are discharged to a dump. The material delivered by the classifier that meets the minus 10-mesh sand specifications is stacked over the reclaiming tunnel by a radial conveyor. Use of a radial stacker permits storing the sand in three piles, so that while one is draining another is being drawn off to the mixer plant, and the third is being stored in continuous sequence.

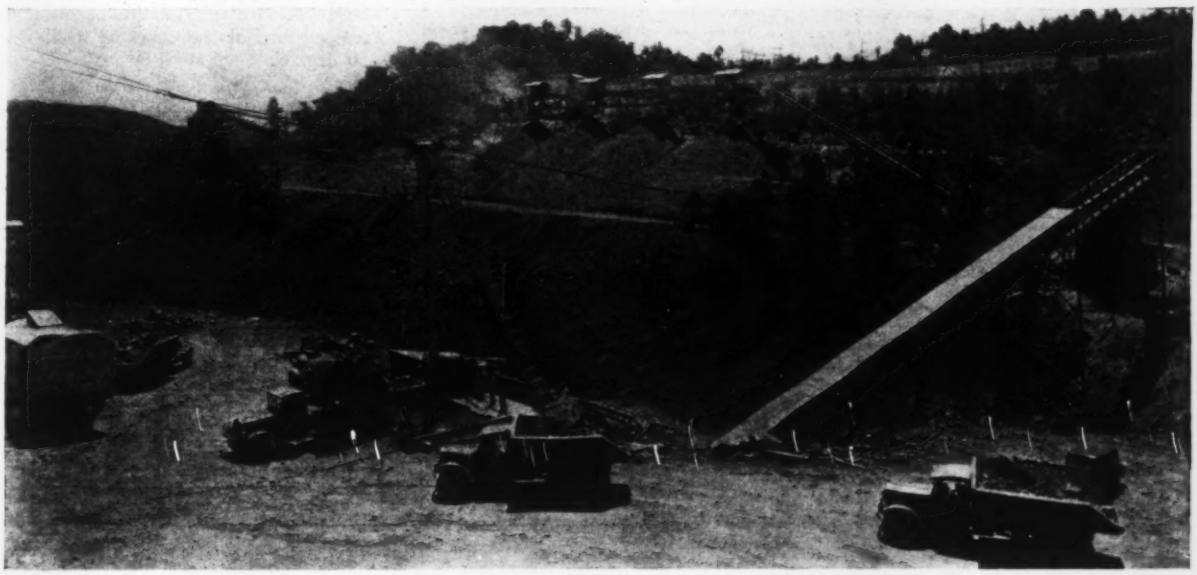
Gates in the roof of the reclaiming tunnel permit the operator to draw from any desired stockpile overhead the size of material desired. The conveyor in the tunnel feeds another on an inclined structure leading to storage bins in the top of the steel tower in which the concrete proportioning and mixing plant is located. By means of electric signals the man stationed at the storage bins in the tower may advise the operator in the reclaiming tunnel of the size of material needed, when to start and when to stop feeding.

Cement-handling plant

All cement for the 1,000,000 cu.yd. of concrete involved in the job will be delivered in bulk by rail to a point about 5 miles from the mixing plant. Box cars in which shipments are received may be spotted twelve at a time on either side of a platform from which two portable pumps unload the cement directly from the cars to a 6,000-bbl. elevated steel silo. The pumps are shifted from car to car on the platform. From the silo cement is delivered by gravity to semi-trailer-type trucks equipped with aluminum tank bodies of 60-bbl. capacity, which are used to deliver cement to the dam. Loading takes about 5 min. The design of the trucks permits the semi-trailer tanks to be disconnected so that the tractors may be used for other hauling. Use of aluminum for tanks permitted an increase of about 10 per cent in the amount of cement that can be hauled per trip, as compared with steel tanks.

From the silo at the railroad to the mixing plant the trucks operate over

FIG. 4—TEN YARD TRUCKS, loaded by 3-yd. electric shovels at the quarry face, dump into the hopper of the primary crusher, left center foreground, from where rock is transported across to the secondary crusher, extreme right. From the secondary crusher rock passes to the classifying screens over the stockpiles and to the sand mill. The cement silo and the mixing plant are beyond the trees at the left.



the heavy-duty concrete road built by the Tennessee Valley Authority to give access to the project. For nearly 2 miles the grade is up, the maximum being 8 per cent, with the rest of the haul slightly downhill.

At the dam end of the road and 230 ft. distant from the mixing plant is an unloading plant to which the tank trucks deliver cement. The ground elevation at this unloading plant is about the same as that of the top of the storage bins in the mixing plant. The trucks drive over a dumping platform housed to protect the cement from the weather and dump to a hopper that feeds either of two stationary cement pumps. These pumps may both deliver directly to the cement-storage bins in the mixing plant through a 5-in. pipe suspended from a cable, or to an elevated 6,000-bbl. silo alongside the receiving hopper of the dumping platform. The silo feeds, when desired, into the hopper for delivery to the mixing plant.

Storage at both ends of the haul gives sufficient flexibility to take care of ordinary variations in shipment of cement or in operation of the mixing plant. The fleet of tank trucks may thus be in regular operation without regard to whether the mixing plant is running.

Simple but effective precautions in the way of housing have been taken to protect the cement from rain and from atmospheric moisture due to high humidity.

Practically the entire plant is of steel construction erected throughout with rivet bolts at important connections to permit easy dismantling and re-use in future projects of the TVA program.

Details of the mixing plant and the system of moving concrete from that plant to the dam will be described in subsequent articles.

A. E. Morgan is chairman and chief engineer of the Tennessee Valley Authority. C. A. Bock is assistant chief engineer, C. H. Locher construction consultant, and A. J. Ackerman construction plant engineer. Barton M. Jones is construction engineer, and C. D. Riddle is assistant construction engineer on Norris Dam, with Ross White as superintendent of construction and F. C. Schlemmer and E. M. Whipple assistant superintendents of construction.

Evaluating Compressive Strength of Concrete Cured at 50 Deg. F.

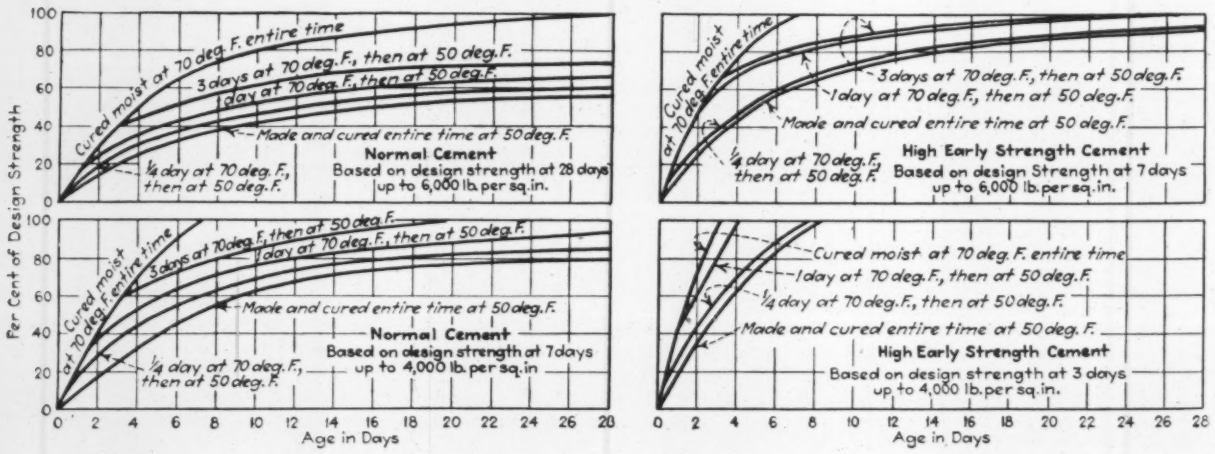
By A. G. Timms
Assistant Manager, Research Laboratory, Portland Cement Association, Chicago

WHEN concrete mixtures are designed on the basis of compressive strength, it is ordinarily assumed that the concrete will be given an initial moist curing and be maintained at a minimum temperature of 70 deg. F. for a sufficient period to develop the desired strength. In many cases, particularly in the fall of the year in northern climates, concrete is subjected to sudden drops in temperature which may last for several days. Under these conditions some doubt may arise as to how long the forms should be left in place or when the structure may be safely opened to service. To give information on these points, the accompanying figures were constructed from the data given in the paper "Temperature Effects on the Compressive Strength of Concrete" by Messrs. Timms and Withey in the January-February *Journal* of the American Concrete Institute. These figures show, for concrete designed on a given age-strength basis, the time required to obtain various percentages of that strength when stored in air at 50 deg. F. and with varying periods of initial moist curing at 70 deg. F.

The graph for normal cement is divided into two charts, one for design strengths at 28 days, the other for design strengths at 7 days. The graph for high-early-strength cement is similarly divided, except that the design strengths are for seven and three days. A study of these charts will show how the data can be applied. Suppose, for example, that the concrete is designed on the basis of strength at 28 days, using a normal cement. The upper chart for normal cement concrete shows that, if cured moist for three days at 70 deg. and then in air at 50 deg. for seven days, the strength will be 60 per cent of that intended in the design. If, however, the concrete received only one day of moist curing at 70 deg. before exposure to air at 50 deg., the total age required to produce 60 per cent of the design strength would be sixteen days. It will be noted that the percentage values are independent of the actual strengths. The values are based on interpolations from a number of curves where the design strength ranged from 1,000 to 6,000 lb. per sq.in.

In considering these charts it should be kept in mind that the test specimens were 3x6-in. concrete cylinders made in paper molds and cured in the molds for the full period at 50 deg. F. In this size specimen the concrete temperature is practically that of the surrounding air; in larger masses the temperature of the concrete will generally be somewhat higher than the surrounding air. These test results probably represent what may be expected under job conditions if the temperature of the concrete itself is at 50 deg. F.

STRENGTH of concrete made with both normal and high-early-strength cement at various ages when cured for part or all of the period at 50 deg. F. Values are given in per cent of design strength based on 70-deg. curing.


Per Cent of Design Strength
Age in Days
Cured moist at 70 deg. F. entire time
3 days at 70 deg. F., then at 50 deg. F.
1 day at 70 deg. F., then at 50 deg. F.
¼ day at 70 deg. F., then at 50 deg. F.
Made and cured entire time at 50 deg. F.
Normal Cement
Based on design strength at 28 days up to 6,000 lb. per sq.in.
High Early Strength Cement
Based on design Strength at 7 days up to 6,000 lb. per sq.in.
Normal Cement
Based on design strength at 7 days up to 4,000 lb. per sq.in
High Early Strength Cement
Based on design strength at 3 days up to 4,000 lb. per sq.in.

Modern Planning and Design Characterize New Jersey Highway

Pompton Turnpike, northwest of the Newark metropolitan area, shows farseeing location and roadway design practices and introduces an innovation in joint design which provides strength for load transfer and watertightness

NOVELTIES in design and construction give exceptional prominence in current highway operations to a 10-mile relocation in Morris and Passaic counties of the Pompton Turnpike, the main New Jersey highway from Newark northwest to the New York state line. At present, as shown in Fig. 1, the section of the turnpike being considered takes a somewhat crooked course from Mountain View through Riverdale, Bloomingdale, Butler and Smith Mills, crossing railways and streams several times. As relocated, the road bypasses these towns and other points of congestion and reduces the number of railway crossings and bridges. In place of two paved lanes it provides four, each pair separated from the other by a 16-ft. grass strip and two 2 ft. shoulders.

Both the design of the new road and the methods employed in its construction are unusual. This article describes the location and the roadway and pavement design, and in particular the special joint construction that has been introduced this year by the New Jersey highway department. A second article will describe new construction methods and equipment being employed on the part now under construction.

Location

Pompton Turnpike, over the part included in the relocation plan (Fig. 1), has a normal traffic of about 5,000 vehicles a day, with days of much heavier traffic and with peak counts of 2,000 vehicles an hour. This traffic called for greater road capacity. In general, the ruling policy of the highway department is in such cases to bypass congested places by a new location; it finds that local and through-traffic interference disputes and accident frequencies are reduced by bypassing and that ordinarily it is more economical to secure new right-of-way through open land than it is to purchase easements for widening and line straightening where the roadside property is developed. In addition, more freedom is given for roadside design and the adoption of alignment and profile suitable to modern traffic requirements.

A study of traffic on all roads in the zone of traffic of the road being planned was the first step in developing specific plans. The manner of charting the traffic count is shown by Fig 2; the figures given are those of an actual three-hour count. Based on the flow of traffic indicated and on the peak traffic as the index of congestion, the required capacity of the planned road was estimated, having regard to future growth of traffic and the probable effect of the new road in redistributing traffic. This calculation was made for several practicable new locations and project lengths, and for each the traffic values, design advantages and construction costs were integrated. Final analysis settled upon the route shown in Fig. 1 as presenting the most advantages.

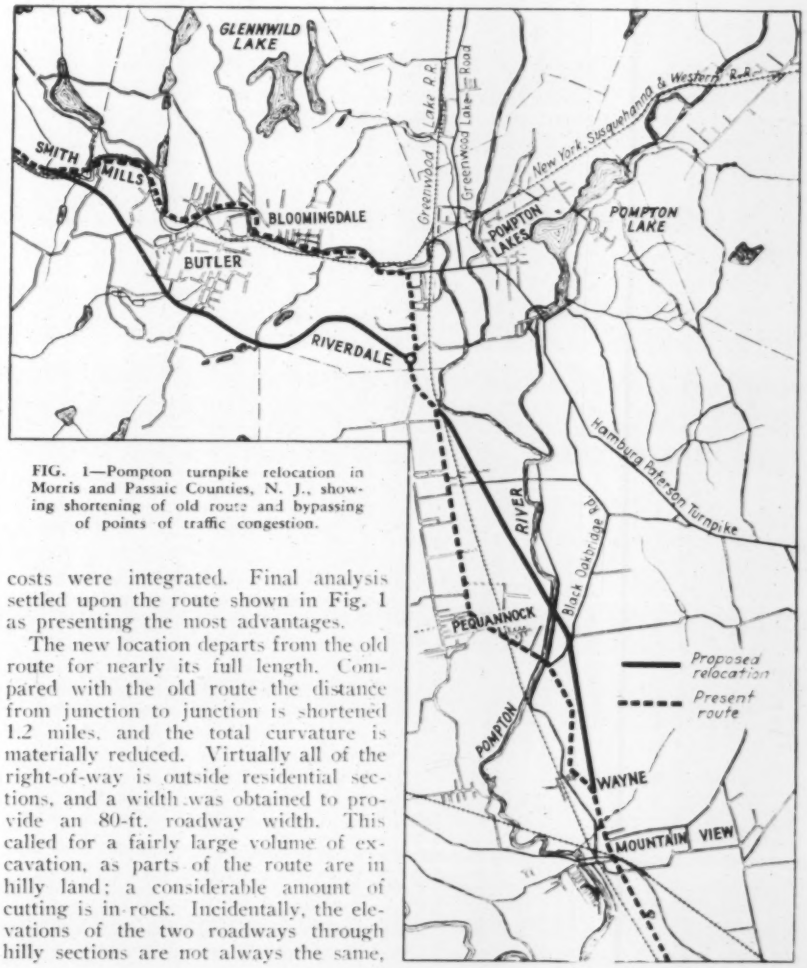


FIG. 1—Pompton turnpike relocation in Morris and Passaic Counties, N. J., showing shortening of old route and bypassing of points of traffic congestion.

The new location departs from the old route for nearly its full length. Compared with the old route the distance from junction to junction is shortened 1.2 miles, and the total curvature is materially reduced. Virtually all of the right-of-way is outside residential sections, and a width was obtained to provide an 80-ft. roadway width. This called for a fairly large volume of excavation, as parts of the route are in hilly land; a considerable amount of cutting is in rock. Incidentally, the elevations of the two roadways through hilly sections are not always the same, there being a difference of as much as 2½ ft. in one case. The purpose of this variation in grade is to save earthwork and better to fit the abutting properties.

Roadway design

The design of roadway is shown by Fig. 3; its notable elements are the flat transverse profile and the earth center strip, with its bordering shoulders, which permits widening the pavement when traffic requires greater width. It is a principle of New Jersey highway department design that nearly all main-road pavements should provide for ultimate widening. So in this design (Fig. 3), the earth center strip and shoulders (20 ft. wide) allow for two additional lanes of pavement when traffic requires. So, also, the uniform-depth paving slab is standard New Jersey practice because, it is considered, it accommodates itself more readily to the tying on of additional lanes of pavement when a wider surfacing is required.

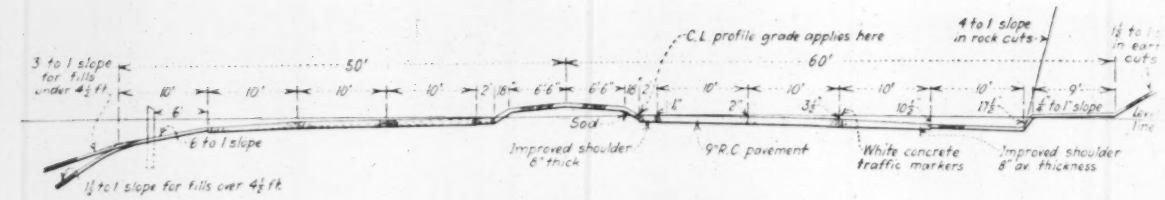

C.L. profile grade applies here
4 to 1 slope in rock cuts
3 to 1 slope for fills under 4½ ft.
50'
60'
Soil
6 to 1 slope
Improved shoulder 6" thick
9" R.C. pavement
White concrete traffic markers
Improved shoulder 8" av. thickness
1½ to 1 slope for fills over 4½ ft.

FIG. 3—SECTION OF ROADWAY for Pompton Turnpike cutoff, showing flat transverse profile and earth center strip which permits future two-lane widening.

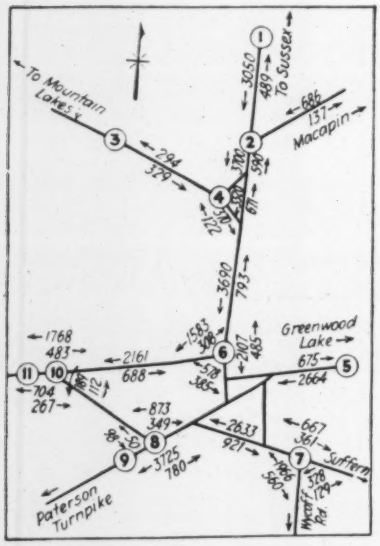


FIG. 2—TRAFFIC-COUNT CHART, showing method of recording traffic flow at points within traffic zone tributary to planned relocation. Figures are for a three-hour count.

Each two-lane half of the paved road consists of two 10-ft.-wide slabs separated by a longitudinal joint with a transverse expansion joint every 56 1-3 ft. The slabs are reinforced 2 in. below the surface with welded wire mats 9½ ft. wide and 12 ft. long laid with the ends lapping 12 in. The spacing of the mat bars is 6 in. transversely and 12 in. longitudinally. At each end of the slab the edges are strengthened by a ¾-in. longitudinal bar 10 ft. long set in 5 in. from the edge of the slab and having the ends bent down 4 in. into the concrete. The slab is 9 in. thick of about 1:1.75:3.42 concrete.

New joint design

The new feature of the pavement design and construction is the joints—both for expansion and for the longitudinal separation of the slabs. In common with experience in other states, New Jersey roads have in recent years shown increasing unevenness of the slab ends at expansion joints. Joint roughness was the result of depression of the slab ends beyond the joints in the direction of traffic. Irrespective of the original cause, the depressed slab end settled lower and lower under the beating of traffic with the frequent result of a crack 6 to 8 ft. beyond the joint in the direction of traffic and parallel to the joint. Remedy was sought by increased dowel strength: the original ¾-in. dowels were increased to 1 in. and stricter attention was given to dowel alignment with the slab. Continued observation of the joint section showed that in wet weather the traffic was squeezing subgrade water carrying soil upward through the joint and laterally to the joint ends to form mud boils in the shoulders. This pumping out of the subgrade soil finally left the end of the slab unsupported, causing it to settle more and more and, unless raised by mud jacking, perhaps finally to crack.

It appeared that fundamentally the fault lay in poor joint installation or design or in both. To find the cause and the remedy, an accelerated traffic test was made on a test pavement, built with several types of joints. Out of the several indications of these tests came two conclusions that have been held elemental in the design of the joint adopted this year. These were: (1) the joint must be as nearly watertight as is practicable, and (2) it must have ample strength to transfer full traffic load across the interruption made by the joint in slab continuity. Incidentally, it appeared conclusively that exact alignment of dowels both horizontally and vertically is the very essence of a good joint.

Expansion Joints—Transverse joints presented the most difficult design problem. Improving on one of the test joints, which showed promising load-transfer abilities, the joint shown in Fig. 4 was developed. The essential elements are: (1) two-dowel supporting channels *A* set parallel across the slab 20 in. apart and carried at the ends on brackets at the forms: (2) twelve channels dowels *B* carried on the lower flanges of the channels *A*; these are set with the webs vertical and span the joint through slots in the premolded joint material *C*; (3) a waterproofing

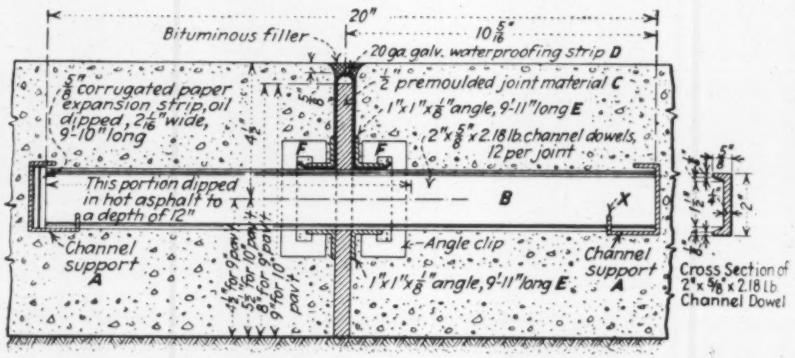

20"
Bituminous filler
20 ga. galv. waterproofing strip D
½" premoulded joint material C
corrugated paper expansion strip, oil dipped, wide, long
1"x1"x⅛" angle, long E
2"x⅝"x2.18 lb. channel dowels, 12 per joint
This portion dipped in hot asphalt to a depth of 12"
B
X
Channel support A
Angle clip
Cross Section of 2"x⅝"x2.18 Lb. Channel Dowel

FIG. 4—EXPANSION JOINT, showing various elements of joint and frame structure.

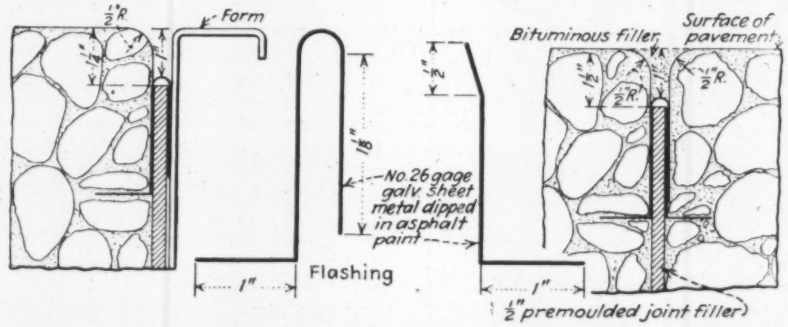


FIG. 5—LONGITUDINAL JOINT, showing method of assembling flashing which provides water cutoff.

strip *D* capping the premolded joint material and seating on the dowels, Fig. 4; (4) a pair of bearing angles, *E*, on each side of the joint, each pair held tight vertically against the dowels by seven clips *F*. All dimensions and other details are indicated by Fig. 4.

The two characteristics sought in this joint design were positive closure against the entrance of surface water and high load-transfer strength. Irrespective of slab expansion and contraction, which are provided for by the usual means of sliding dowels and an elastic joint filler, the flashing strip prevents water from passing down through the joint to the subgrade and from being pumped up by traffic through the joint from a wet subgrade. This metal waterstop also helps to check extrusion of the filler. Any kind of premolded expansion-joint filler can be used.

Load-transfer strength lies in (1) greater beam strength of channel dowels and close spacing of dowels and (2) distribution by bearing angles along the joint faces of the crushing action of the dowels on the concrete. The supporting channels *A* insure exact dowel spacing and alignment once they are lined up axially with the joint and to exact elevation in the slab depth. To insure spacing, the upturned lip (*X*, Fig. 4) of the lower channel flange is notched for the dowels or, where the lip is omitted as on the Pompton Turnpike, the channel flange is slot-punched to form a double clip for the dowel end. The bearing angles at the faces of the joint, being clamped tight to the dowels, act as continuous beams to distribute the bearing pressure of the dowels to the concrete, preventing too great a stress concentration on the concrete at the dowel so that crushing and bellholing of the concrete may not result.

Longitudinal Joint — Longitudinal joints between adjacent 10-ft. slabs or between pavement and curb, like expansion joints, have a premolded filler protected by a metal flashing. Fig. 5 shows a complete joint. The flashing, as shown, is made in two parts either of which may be installed as the first operation.

The Pompton Turnpike cutoff has been planned and the new joint design developed by the engineers of the New Jersey highway department, of which W. G. Sloan is state highway engineer.

A GENERAL VIEW OF BOULDER DAM CONSTRUCTION ACTIVITY

FROM a vantage point high up on the Arizona rim of the canyon, a remarkable panorama of Boulder Dam construction activity is presented. The view is downstream and encompasses work from the power-house site to the Nevada spillway. In direction it looks west, and Boulder City lies about 10 miles on a straight line behind the high peak in the center of the picture.

Beginning at the left-hand edge, the visible features are briefly reviewed. The Arizona spillway is not shown, but the dark band is the masonry wall which will carry the highway from the crest of the dam across the spillway and south into Arizona. The two intake towers (base at El.894) and the stiff-leg derrick used to handle material and concrete for their construction show immediately to the left of the dam. Directly over them in the picture, and situated on the Nevada canyon wall more than 1,200 ft. downstream from the dam, appear the ends of the six canyon-wall outlet pipes (El.820), which will be equipped with 84-in. needle valves; these outlets are duplicated on the Arizona side. Immediately upstream is a dark shadow which marks the portal of the construction adit used to take the steel-pipe sections into the penstock header tunnels.

Dam construction is actively under way, with the high blocks at about El.930. The elevation of the crest will be 1232; lowest concrete was at El.503. At the right of the dam are the two Nevada intake towers, and below them is the railroad trestle (El.720), used to deliver concrete from the low-level mixing plant. At the extreme right the downstream end of the Nevada spillway structure is indicated by the concreting trestle.

In the center background are the high-level mixing plant, cement-blending plant and the stationary tower of the 150-ton permanent cableway. The horizontal white spot in the right-central background is the roof of the penstock-pipe fabricating plant.

A comprehensive review of all Boulder Dam construction appeared in a special issue of *Engineering News-Record*, Dec. 21, 1933.

Letters to the Editor

Irrigation from Fort Peck Dam

Sir—Your attention is invited to an editorial appearing in *Engineering News Record*, Aug. 16, 1934, entitled "Planning by Fiat." Both the statement and the inferences in the editorial relative to the use of stored water of the Fort Peck Dam are based on a clear misapprehension of the meaning intended to be conveyed by the President of the United States when analyzed in connection with reports leading to the adoption of the project. This misapprehension therefore results in a statement which is untrue and unfair to the President, as there has been no change proposed in the operation of the reservoir.

Studies of the available power show that incidental to the adopted plan of operation for the Fort Peck Reservoir for navigation and flood control, large blocks of cheap power will be developed, and it is proposed to make available this cheap power for use to worthy irrigation pumping projects of approximately 180,000 acres of irrigable lands located in both the Yellowstone and Missouri valleys, when and if the development of the irrigation projects becomes feasible.

The original report on the Missouri River Basin as prescribed by H. D. 308, 72d Congress, which covers the Fort Peck project, pointed out the benefits to the development of irrigation projects through cheap power incidental to the operation of the Fort Peck Reservoir.

Kansas City, Mo., Aug. 24, 1934. R. C. MOORE, Lieut. Col., Corps of Engineers, Division Engineer, Missouri River Division.

THOUGH THE REPORT of the army engineers did point to the possibility of using power from the Fort Peck Dam to pump water for irrigation, we have been reliably informed that no irrigation use of Fort Peck water has been contemplated in connection with the planning of the project. —EDITOR.

Overpour Hazard at Grand Coulee at Grand Coulee Dam

Sir—Comparison of the maximum energy wasted by floodwaters in passing over dams of the overflow type brings up the question of what provision is planned for dissipating the great amount of energy to be wasted at the foot of the Grand Coulee spillway. Even a reasonably conservative estimate places the amount of this energy at approximately twice the maximum ever before dissipated in this way or, if the high dam is built, nearly four times as much.

Relatively few dams have been built on large rivers with spillways on the main dam itself. In such dams there has been preference for structures arched in plan so that the additional stability of wedging in the canyon would lessen any risk that might arise from vibration or from undermining of the downstream toe. The accompanying table records a compilation of data relative to overpour dams on large streams, with particular reference to energy to be dissipated when maximum power has to be wasted. Figures in the table relative to dams not yet built are only approximate, of course.

At the Grand Coulee Dam, with power of unprecedented amount to be dissipated, there may be vibration problems not previously met, or factors of unknown moment might be introduced by ice jams or by other conditions whose exact nature cannot be foreseen and the resultant stresses calculated. In this structure, or in any other across the main channel of the Columbia, any undercutting or any damage to the concrete apron in time of flood probably could not be reached for purposes of repair for many months. During that time the risk of progressive damage would be great. Certainly it will interest engineers to know just what the plans are for energy dissipation in or just below the Grand Coulee Dam.

San Francisco, Calif., July 26, 1934. K. T. ROBERTS

Design for Side-Hill Cuts

Sir—My article "Improved Highway Design for Side-Hill Cuts," as it was published on p. 114, *ENR*, July 26, 1934, omitted credit, which I would like to add to make sure that our attitude is not misunderstood.

In developing this design the National Park Service has profited by studies made by many pioneers working on this problem. James Allen, former state highway commissioner of Washington, adopted the policy of the gutter along the outer edge; many state highway departments have paved tightly against the cut slope to gain additional travelable roadway without widening exising deep cuts, and probably some have used the concrete curb to reduce infiltration of road-surface water. One of our earliest projects for the full-roofed road type was laid out in our plan dated March 5, 1931 (which could not be included in the article and was partly constructed that year).

The later urgency for adopting such section was prompted by Horace M. Albright, former director, National Park Service, who insisted that the over-all width of scar made in connection with roads must be reduced. The full-roofed section was the outcome of a study of old and new practices to obtain reduced scar, greater travelable width of roadway and reduction of surface water hazard. F. A. KITTREDGE, Chief Engineer, National Park Service.

San Francisco, Calif., Aug. 10, 1934.

The Barge Lift at Norris Dam

Sir—I desire to correct a misapprehension with respect to the plans of this department for a barge lift in the Norris Dam, which is referred to in an article on the design of that dam published in *ENR*, July 12, 1934, p. 44.

The comprehensive report on the Tennessee River, published in House Document No. 328, 71st Congress, 2d session, presented in accordance with the provisions of the law directing the survey the ultimate use that may be made of the waters of the Tennessee Basin by the United States and its citizens. It contained plans for the maximum development of the river and its tributaries for navigation, power production and flood control. The total estimated cost of all these works was in excess of one billion dollars. In presenting this report the Chief of Engineers pointed out that this sum is not to be confused with the cost of any project to be executed at the expense of the United States government. This plan for eventual development included a barge lift at the Norris Dam and at all similar higher reservoir dams on which possible eventual demand for navigation could be foreseen. The construction of such barge lifts, however, was never recommended by any official of the Engineer Department, and at no time received serious consideration in the plans of the department looking toward the construction of the dam.

It cannot, therefore, be correctly stated that the present plans for the dam provide for the elimination of the barge lift, since this barge lift never had a place in the design of the dam except as a distant possibility in the indefinite future. G. B. PILLSBURY, Brigadier General, Acting Chief of Engineers.

Washington, D. C., Aug. 24, 1934.

THE ECONOMIES referred to in the article in question were those made possible by the entire elimination of the barge lift, even as something to be considered as a distant possibility. As General Pillsbury states, no estimate of the cost of navigation facilities was included in the army engineers' report, but the design for the dam at Cove Creek (Norris Dam) included in that report (See *ENR*, May 11, 1933, p. 583) made provision for the possible future construction of a barge lift, not because the army engineers recommended it but because they were under instructions to consider the possibility of making the stream navigable. Of necessity, the lift had to be located near the center of the dam where it was accessible

ENERGY TO BE DISSIPATED AT VARIOUS OVERPOUR DAMS

Dam	Type	Gross Head, Ft.	Net Head at High Water, Ft.	Max. Flow of River, Sec.-Ft.	Energy to Be Dissipated, Hp.
Rock Island	Arch	0	0	710,000	None
Baker River	Arch	300	300	31,000	930,000
Boulder	Arch	580	580	200,000	11,600,000
Conowingo	Straight	90	70	850,000	5,950,000
Proposed Grand Coulee (low dam)	Straight	176	150	750,000	11,250,000
Proposed Grand Coulee (high dam)	Straight	342	300	750,000	22,500,000

from the channel below. So located, it became the controlling factor in the location of the spillway and the power house. Unhampered by any such limiting factors, the engineers of the TVA have been able to produce a design which they believe can be built much more economically than a dam that has to provide for future navigation facilities. —EDITOR.

Importance of Rainfall Records

Sir—The article, "Problems in Using Government Data on Rainfall and Run-off," by C. H. Eiffert (*ENR*, Aug. 16, 1934, p. 200) is very timely. Everyone who has tried to work out the trend or direction of storms and the areas covered in any time interval by them has met with the difficulties to which he has called attention.

This department has been making a study of storm rainfall in this state, and the lack of coordination between the records from different stations has made it very confusing. With especial reference to the records maintained by the U. S. Weather Bureau, it does seem that some particular time could be selected so that all stations, whether first-order or voluntary, would report for the same preceding 24 hours on each date. As it is, the results are misleading when the three different time relations are used, and there is no way of working out the difficulties from the data published.

Futher, the distribution of rainfall stations is not uniform. There are areas in the state of Texas as large as 8,000 square miles in which not a single gage is reporting—this in spite of the fact that there are some 250 stations reporting every month. An example may be given of the Devils River watershed of over 4,000 square miles, in which there was located only one gage during the storm of August and September, 1932, when a runoff of approximately 138 sec.-ft. per square mile was recorded, and this gage was situated on the extreme boundary of the drainage area.

Continuity of records seems to be another factor, the importance of which is overlooked. For instance, there is a record of an automatic gage at Taylor, Texas, from 1902 to 1932, during which interval several records were set. In April 1905, 1.80 in. of rain fell there in 10 min., which is far above the ordinary rain. In September, 1921, 23.11 in. of rain was recorded in 24 hours at this same station. This has only been exceeded once in the United States, that being in Florida, when 23.22 in. fell in 24 hours at New Smyrna, Oct. 9-10, 1924. Both rains are far above the 30-year frequency indicated, and yet since that gage has been discontinued we will have no chance to find out what the real frequency is. It is unfortunate that the economic program has brought about such results.

This is said, not with the view of fault-finding criticism, but with the idea that if the importance of a better coordination of government data is called to the general attention we may get better results. It is hoped that engineers most interested in the subject will not be backward in expressing their views on it, and that changes may be brought about which will remedy the situation.

Austin, Texas, Aug. 22, 1934. ROBT. L. LOWRY, JR. Technical Assistant, Texas Reclamation Dept.

Skew Arch and Frame Design

Sir—In a concrete skew arch or rigid frame sustaining vertical forces symmetrical about the longitudinal center line the thrust and moment on the transverse plane *AC* computed by Mr. Gifford's method (*ENR*, May 3, 1934, p. 574) will be the same as those computed with the elastic equations developed for the stresses in three-dimensional space. The thrust and moment for vertical forces may also be computed by considering a unit width lamina in a single plane parallel to the spandrel wall.

However, if a skew arch or frame carries horizontal forces or temperature stresses, torsional stresses, which often cannot safely be neglected, are induced in the rib. Mr. Gifford has grouped the design rules for skew arches according to their angle or skew, but the torsional stresses vary not only with the angle of skew but also with the ratio of rise to span length in skew arches and with the height of walls in skew rigid frames.

Sacramento, Calif. A. A. EREMIN. Associate Bridge Designing Engineer, California Highway Division.

Sir—Respecting Mr. Eremin's comments: As stated in the article, the method will be found satisfactory for preliminary design in determining a trial section, and gives results comparing favorably with the so-called exact methods. No attempt has been made to try to convince the profession that this is an exact solution of the problem.

The thrusts and moments acting on the various sections of the frame may be computed approximately by considering a unit width in a single plane parallel to the spandrel walls, but only within certain limits of skew, which I have restricted from 0 deg. to 15 deg. For skews more than 15 deg., it is advisable to follow Professor Rathbun's theory, using the elastic properties of a span perpendicular to the abutments.

Professor Rathbun, in his notable paper published in the *Transactions*, 1924, of the Am.Soc.C.E., states " . . . if all the loads are *vertical, symmetrically* placed and lie in a plane that is midway between the spandrel walls, a section parallel to this plane and to the walls can be used for the purpose of a *trial analysis*" . . . "The section used in laying out the arch ring is made by a vertical plane perpendicular to the barrel of the arch rather than parallel to the spandrel walls." A study of the illustrated problem of a skew rigid frame, published in Arthur G. Hayden's book "Rigid-Frame Bridges," will show that the effect of the torsional moments and thrusts caused by earth pressure and temperature acting on the various critical sections is relatively small compared with the torsional moments and thrusts caused by the dead load and vertical live loads. This is true only for skews less than about 30 deg. For skews more than 30 deg., these moments and thrusts play an important part in the design, and it is for this reason that I have suggested following the explanation by Mr. Hodges, using the approximate method only to determine a trial section. The moments and thrusts caused by the horizontal earth pressure acting on the spandrel walls are negligible for the rigid-frame type of bridge.

It must be remembered that the skew-arch theory has been developed to the satisfaction of the engineering profession only for determining the moments and thrusts acting throughout the structure; the design of the steel reinforcement still remains a moot question.

New York, N. Y. EDWARD F. GIFFORD, Engineering Department, New York Central R.R.

Eddies in Air Flow

Sir—I wish to express my appreciation of the excellence and timeliness of the two articles by W. Watters Pagon, published by you in recent months and dealing with the general subject of aerodynamics in civil engineering practice. The second article (*ENR*, July 12, 1934, p. 42) is especially interesting because it illustrates the fact that the solution to some engineering problems, involving the mechanics of fluids, requires a knowledge of the detailed structure of flow as well as of the average conditions of flow. It is especially gratifying to learn that his observations of the smoke eddies behind a cylindrical stack lend quantitative support to von Karman's theory of the "vortex street." While this theory has been quite thoroughly validated for flow behind relatively small obstructions, there is a dearth of experimental evidence at very high values of Reynolds' Number.

In the second article Mr. Pagon states that his computations show a seeming inconsistency between his observations and those of Relf (*Phil. Mag.*, Series 6, Vol. 49, p. 510). However, this is because he has interpreted the frequencies given by Relf to apply to one vortex row, whereas Relf makes no mention of whether the frequencies apply to one or to two rows. The description of apparatus and the fact that the frequency curve fits results previously obtained with very small wires indicate that Relf's frequencies apply to the entire staggered system of eddies. Under this interpretation the inconsistency disappears.

Ann Arbor, Mich., Aug. 23, 1934. R. H. SHERLOCK, Professor of Civil Engineering.

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September 6, 1934

A Transportation Principle

ONE of the fundamental principles of the national recovery campaign is that industry and business should not operate at a loss but should place their price system on a compensatory basis, and the code system of the NRA aims to assure such price systems. With even greater force this principle applies to regulated industries such as railroad transportation. Compensatory rates are a first essential to make railroad operation sound in the interests of efficient transportation. This principle is at stake in the current request of the leading railroads for a rate increase. Rates are not now compensatory. Traffic continues to be of too small volume to assure railroad solvency; costs have risen and are still rising—a ten per cent increase in living cost is noted in the first Richberg report on recovery activities, and materials prices also are up. Finally, a further charge has been laid on railroad revenues by the new employee retirement law. Under these circumstances it is clear that if the transportation system is to survive as a useful and solvent service agency it is entitled to such adjustment as will produce compensatory rates.

Freedom to Hire

A REFORM in employment regulations that contractors will appreciate has been introduced in the new provisions adopted by the Bureau of Public Roads for NRA contracts. Instead of being subject to the relief-employment agency's demand that men registered as heavy-equipment operators be given a trial before they are refused employment, the contractor is now made the sole judge of fitness. He may decline to give the applicant a trial if he is not satisfied of the applicant's competence. In brief, the contractor resumes his former right to exercise his own discretion and judgment in choosing the men to whom he will entrust the handling of his costly machines. It is common knowledge that the virtual denial of this right under the recent practices of relief employment has cost equipment owners heavily. Before incompetence could be proved, equipment was often damaged, entailing not only the cost of repairs but the additional loss of earnings during the period the machine was laid up. No other regulation of relief employment led to so much complaint by contractors. In removing the cause the Bureau of Public Roads has curtailed unprofitable expenditure and hastened the accomplishment of income-producing public improvements.

Politics at the Working Place

CONSTRUCTION AND ENGINEERING are concerned no less than other industry in the revolutionary—and seemingly quite arbitrary—decision of the National Labor Relations Board in favor of majority control of worker groups for collective bargaining. Not only does the ruling wipe out the rights (and so in effect the existence) of the individual craftsman despite the specific guarantee given the individual worker in the Recovery Act, but it places job and craft politics in a recognized position of dominance. Each working organization hereforth is apt to become more concerned in the jockeying between the 49 and the 51 per cent that assures control of the worker group than in carrying on its service and improving its technique and performance. The construction job, with its rapidly shifting array of labor forces, offers a peculiarly favorable battleground for job politicians, and one that may become even more animated through the promised future rulings of the board on size and nature of the units to which the majority count is to apply. The present decision threatens to set back the cause of equitable relations between labor and industry, and neither area agreements nor contracts are likely to counteract its effects.

The Profession Goes National

A DEFINITE STEP toward nationwide professional engineer organization was taken on Monday of this week when the recently formed National Society of Professional Engineers adopted a constitution and prepared for work. The event is important because of the possibilities and promise of the professional guild-organization movement. All the trends of the times point to the need for such organization. Dominance of group action and subordination of individual influence characterize every phase of the reordering of human and economic relationships that is in progress, and professional engineers therefore, if they are to have proper voice in the community, are bound to assemble in a national group. This grouping they have lacked up to now. Such bodies as the American Association of Engineers and American Engineering Council have rather different objectives. But since current events show the practice of the engineer's profession to be quite as closely intermeshed with the functioning of industry, with national policies and with the whole economic mechanism as is the work of any industrial group, effective organization of the legally recognized class of licensed engineers should be deferred no longer. The ground was well prepared for professional unity by the past dozen years' work in setting up a defined profession in most states—a profession defined, as it should be, by the dictates of public welfare. Erected on the separate state professional structures as a base, the national society has a constructive function in making the group thus defined concrete and articulate. The new organization may not be static, however. Realization of the possibilities of the movement is not an automatic process, but can be achieved only by energetic work. The wisdom, vigor and sincerity of the effort applied to the task will determine the result.

Rational Design Advanced

A BOLD ATTACK on the problem of expansion-joint design for concrete pavement has been made by the engineers of the New Jersey state highway department. As described in this issue the new joint departs radically from prevailing design principles. Dependence solely on a zone of elastic material across the pavement and a few dowel bars to hold the ends of the severed slab in surface alignment is abandoned. A rigid structural framework of steel is substituted. The elastic filler is retained, but only as a filler, for the new joint structure provides a metal seal against water and dust. Load transfer across the joint is provided by a veritable span

of steel having a beam strength substantially equal to that of the unbroken pavement. The interest of this design lies less in its individual fitness to perform its task than in its recognition that a pavement joint has a structural duty to accomplish. This does not consist merely in functioning to permit changes of slab length; it has also to provide continuity of beam strength of the pavement across the articulation that allows for changes in slab length. Continued effectiveness in both functions requires exclusion of water and dirt from the articulation. It is distinct progress to have these facts realized in joint design. With the material improvements recently made in elastic joint filler, promise is held out for solution of a problem of detail that has generally been weak in concrete paving practice.

One of Many

A SIGNIFICANT BIT OF TESTIMONY appears in the published report of Senate committee hearings on the public-works bill introduced last Spring by Senator Robert M. LaFollette. Mayor T. Semmes Walmsley, of New Orleans, testifying before the committee on some causes of delay to the recovery campaign, said as to PWA applications: "There were a great many cities which filed on the lease system, and after having gone through various departments of the PWA, these municipalities were informed that the lease system was not looked upon with favor although it was authorized by the act; that where it was possible for bonds to be issued the PWA wanted bonds. That was the case with the city of New Orleans. Then Mayor Walmsley records one of the many experiences with the PWA's financial and legal machinery that have kept men unemployed. It is much the same experience that Denver had at a later date with its water tunnel. To round out the picture of obstruction by which the legal and financial sharpshooters of the PWA blocked progress of the public-works recovery campaign, a case of different detail may be noted from Oregon. Early in January the PWA authorized a loan to that state for building five large bridges on the Coast Highway; six months later the legal papers were still being quibbled over by the PWA lawyers, the money that should have been converted into wage payments was still held in the Treasury, and thousands of men were still waiting to be employed. Such are some of the ways in which the PWA failed to carry out its responsible job of breaking the depression and relieving human distress.

"It Is Probable . . ."

DONALD R. RICHBERG, executive secretary of the President's executive council, gives some revealing figures in his third report to the President. His tabulation shows that from June, 1933, to June, 1934, inclusive, the national relief roll *increased* from some fifteen million to nearly seventeen million individuals, the relief cost to the federal government from $60,000,000 per month to $125,000,000. Further, he forecasts that the trend of relief during the next eight months will be upward, to reach a total of some twenty-two million persons by spring! This ominous outlook justifies the question of how far the CWA program of last winter contributed to recovery. The figures answer, fairly conclusively, that it had no effect on the volume of normal unemployment but was a mere relief device. Significant also is the fact that PWA operations made no visible change in the slope of the unemployment curve—proof of the inadequacy of last year's appropriations, in their slow application, to promote business recovery. One may easily read out of the report certain outstanding truths: That the wastes of the relief system and its ineffectiveness are demonstrated in the steady increase of the unemployed; that a disciplinary work system like the CWA is equally ineffective. Finally, it may be judged that Washington management of a nationwide recovery construction program is fraught with almost insuperable difficulties. The inescapable conclusion is that ultimate dependence for a mass re-employment and business recovery must be placed on large-scale utilization of necessary local improvements, carried out by sound business method; and that in so far as federal financing is necessary to such programs, the funds must be made available with the speed and under the decentralized control that characterized the CWA and FERA operations rather than by the slow-moving and highly centralized methods that brought the RFC and PWA campaigns to failure.

Maps Are Wanting

CONTAINED in the voluminous report of last Spring's survey of national water-resource problems, which has just been issued, are significant statements to the effect that many improvements believed necessary cannot be planned for lack of essential data. Adequate maps are among the missing items.

These statements bring to the fore a long-standing deficiency, one which takes on special prominence now because it bears on much of the planning that is being attempted to meet emergency needs. Only a small part of the country has been mapped, and many of the existing maps are inaccurate or out of date. No better use can be made of some of the emergency money than to organize an active program of surveys and mapping.

Competent men now unemployed are available for the work. Large areas could be surveyed and mapped in a short time and at small cost by vigorous prosecution of the program. Virtually every one of the government's improvement projects now under way or pending would be benefited, and the results would mean as much to private construction enterprise—even to industrial planning—as to direct public undertakings. Economies and efficiencies of large size can be realized, therefore, by the inauguration of comprehensive emergency surveys.

The efficiency of such a program could be further increased by making the work the occasion for that long-considered but always deferred reform of governmental structure, consolidation of all major federal survey and mapping work in a single organization. Now segregated in different departments, the two main agencies, the Coast and Geodetic Survey and the Geological Survey, are uncoordinated and pursue their separate operations independently. Major survey work is done also by other agencies—Land Office, War Department and others. The task of producing the much-needed surveys and maps would progress more rapidly and at lower cost if these activities were joined in one bureau.

Initiation of a broad survey program as an emergency measure, and consolidation of survey and mapping responsibilities in a single establishment, are measures that have special claim to present attention as valuable means to aid recovery activities. Their beneficial effect, however, would be enduring.

CURRENT NEWS

New Engineer Society Adopts Constitution And Elects Officers

MEETING in New York on Sept. 3, the recently formed National Society of Professional Engineers (*ENR*, May 31, 1934, pp. 718 and 720) completed its organization by adopting a constitution and electing officers. Representatives of the New York, New Jersey, Connecticut, Pennsylvania and South Carolina professional engineer groups and of the American Association of Engineers attended. D. B. Steinman, selected as temporary chairman at the initial meeting, presided and Gerald Knight, New Jersey, acted as secretary.

Chief discussion centered on the membership provisions, as it was desired not to exclude qualified engineers resident in states that still lack a registration law, although the requirement of registration or license was made the fundamental basis of membership. It was finally agreed to define "professional engineer" for the purpose of the membership clause as one who (in a state having a registration law) is legally licensed or registered, or (in other states) is (a) licensed in another state, or (b) certified by the National Council of State Boards of Engineering Examiners, or (c) certified by the board of directors of a constituent or cooperating organization as having equivalent qualifications. Qualification (c) is to continue in force only until Jan. 1, 1937. It is understood that the Engineers' Council for Professional Development is included in the scope of the term "cooperating organization."

The officers elected at the meeting are: D. B. Steinman, New York, president; T. W. Battin, Pennsylvania, and Hugh A. Kelly, New Jersey, vice-presidents; Willard S. Conlon, Connecticut, treasurer. T. Keith Legaré, secretary of the National Council, was appointed secretary of the society. Applications of four state societies for charters as Member State Societies were considered and granted. These are Connecticut, New York, New Jersey and Pennsylvania, having a membership of over 3,000.

The new society will meet at Portland, Ore., on Oct. 3, in connection with the National Council of State Boards of Engineering Examiners, whose annual meeting begins on that day.

Great Salt Lake Reaches the Lowest Level on Record

The lowest level of Great Salt Lake ever recorded is reported in the announcement of a recent −1.4 reading (El. 4195.4) on the gage at Saltair, Utah, operated by the U.S.G.S. The lake level usually reaches its lowest point for the year in November or December and this year it is expected that the minimum winter reading will be −2.0 or lower. The lowest level previously recorded, which occurred Nov. 15, 1905, was −1.1.

Bids Called For 110 Miles of Colorado River Aqueduct Project

Bids were called Aug. 30 by the Metropolitan Water District of Southern California for the construction of 110 miles of siphons, canals and conduits for the Colorado River aqueducet project. The cost of this section is estimated at $35,000,000, including rights of way, materials and engineering; only a part of the cost will be covered by the contractors' bids.

Added to the 91 miles of tunnels now being driven, the 110 miles of aqueduct covered in the call for bids will place 201 miles of the aqueduct under construction. Contractors' bids on the new work will be received until 10 a.m., Oct. 3, at the water district general offices in Los Angeles, Calif., according to F. E. Weymouth, chief engineer and general manager of the district.

It is estimated that the work contemplated will require about four years to complete, and that 2,000 men will be given employment over much of this construction period. The new construction has been divided into sixteen bidding units. They include 120 siphons, totaling fourteen miles; 34 miles of covered conduit and 62 miles of lined canals, nearly all of concrete construction. The construction of these units will complete the aqueduct from the Colorado River to a point about twelve miles east of Indio. The total length of the main aqueduct will be 241 miles from the river to a main storage reservoir near Riverside. Distributing mains will be built from this point to the thirteen member cities in the district in the Los Angeles metropolitan area.

Mid-Town Tunnel Strike In New York City Is Settled

With both sides granting slight concessions, the strike of hoist runners and ironworkers on the Mid-Town Tunnel under the Hudson River at New York City has been settled. A month ago when about 60 workers walked out, the trouble threatened to develop into a general strike of all heavy construction workers in the city (*ENR* Aug. 2, 1934, p. 153). The Labor Board of Review, headed by Prof. Lindsay Rogers, held several hearings which resulted in a peaceful settlement of the difficulties. The Mason & Hanger Co., contractor on the tunnel, has agreed to reemploy the striking workmen with the stipulation that they sign an agreement not to walk out again in sympathy with any other unions. Local 102, Compressed Air and Construction Workers Union, will remain in complete jurisdiction of underground work. This union, comprising most of the heavy construction workers in the city, and the contractor won out in the fight for jurisdiction waged by unions of the New York building trades. The tunnel job, never seriously hampered by the strike, will continue to operate as it was started, with the contractors allowed a free hand in hiring. Most of the workers now employed are union men.

Major Philip B. Fleming Named Deputy PWA Administrator

Public Works Administrator Ickes has designated Major Philip B. Fleming as Acting Deputy Administrator. Major Fleming, who has been executive officer of PWA since its beginning, will assume immediately the duties of Col. Henry M. Waite, Deputy Administrator, whose resignation, effective September 1, was announced some time ago.

Major Fleming is an officer in the Corps of Engineers from which he was temporarily detached last year for service with the Public Works Administration. As executive officer during the past year he has served as principal assistant to Colonel Waite.

E. C. Eaton Resigns as Head of Los Angeles Flood Control Work

E. C. Eaton, chief engineer of the Los Angeles County Flood Control District for the past seven years, submitted his resignation to the County Board of Supervisors on Aug. 31, to become effective Sept. 15. Mr. Eaton announced that he was resigning to go into private engineering work. Mr. Eaton was named chief engineer of the flood control district in 1927, succeeding J. W. Reagan. For the five years preceding his appointment he had been in the water rights division of the California department of public works.

During the past two years, controversy has developed on some phases of the Los Angeles county flood control program, particularly in the San Gabriel Canyon project. However, there was no statement made either by the Board of Supervisors or by Mr. Eaton indicating that controversial matters had in any way affected the resignation. At the present time San Gabriel dam No. 2 is practically completed and work is actively under way on the record breaking rockfill dam known as San Gabriel No. 1.

For years the Los Angeles County Flood Control District activities have been involved in political controversy. Policies have been aired in the local press and actions of the supervisors' committee have been investigated by the Grand Jury. The carrying forward of the engineering projects of the flood control program has been difficult because of this continued atmosphere of controversy.

Merging of All Chicago Parks Upheld by State Supreme Court

By an opinion rendered Aug. 23 the Illinois Supreme Court upheld the validity of an act consolidating Chicago's 22 park districts into the single Chicago Park District. A referendum April 10 was favorably voted, following the enactment of the permissive law by the state legislature. Under the new setup the five commissioners are appointed by the mayor, Edward J. Kelly, who is also president of the South Park Board.

Divisional Code Authority Meets in Chicago

TO SECURE first-hand information on construction conditions in the Middle West, the Divisional Code Authority is holding a meeting in Chicago Sept. 5 and 6. This is the first meeting of the authority away from its Washington headquarters and is in line with a recent decision to launch an educational program for disseminating information on the code through contacts and with the cooperation of the local code authorities. The purpose is to familiarize all members of the industry with the administration, aims and benefits to result from the putting in effect of the code.

Following out this program, the divisional code authority for general contractors has invited the state administrative committees for Illinois and ten nearby states to meet with it in Chicago Sept. 6, to discuss the application of the code in those states. The administrative committees for the following states have been invited to attend the meeting: Illinois, Indiana, Iowa, Kansas, Kentucky, Michigan, Minnesota, Missouri, Ohio, Wisconsin and Nebraska.

The meeting of the divisional code authority will be followed on Sept. 8 by a meeting in Chicago of the executive committee of the Associated General Contractors of America, at which time an important report of the association's special committee on industrial relations will be made.

Approval expected

Momentary announcement by NRA of the approval of Chapters II (a), II (b) and II (c) of the construction industry code, covering building, heavy engineering and railroad and highway general contractors, respectively, was confidently expected by the divisional code authority for general contractors as the meeting opened. Officials of the divisional authority stated that satisfactory progress has been made with NRA recently in regard to perfecting these subdivisional chapters, which have been awaiting approval since early in the year, and they indicated that approval of the sub-chapters may be forthcoming within a week.

Another important development expected from the Chicago meeting is the approval and announcement by the authority of its plan for the establishment of bid depositories. Its executive committee, headed by A. E. Horst, chairman, has been working on the plan since the authority's July 26 meeting, and it is understood that a simple and practical line of procedure for the establishment and operation of bid depositories throughout the country has been worked out.

Upon approval of the plan, operation of which will be mandatory, it will be submitted to the construction industry code authority for consideration. Representatives of the industry, as well as the NRA, believe that with a smooth working and mandatory system of bid depositories in operation, many of the worst competitive abuses will be stopped and bid-peddling will be impossible.

Water Conservation Work Started in Santa Clara Valley

A comprehensive plan for effective use of available irrigating water is being undertaken in the Santa Clara Valley, near the southern end of San Francisco Bay, to protect the fruit-growing industry which is menaced by lowering of the water table. Successive years of subnormal rainfall plus increased acreage under irrigation led to a plan for water conservation which would store the winter floods in detention reservoirs until the water can be put into underground basins.

After rejecting a bond issue in 1931 by a majority of about 7 to 1, voters of Santa Clara County on June 19, 1934, approved, by a vote of 7 to 1, a bond issue of $2,000,000 for the necessary work; these funds will be supplemented by a $673,000 grant from the PWA.

The entire $2,000,000 block of bonds recently was sold to a syndicate which bought them on an interest basis of 3.38 per cent—a considerable saving to the district over the 4 per cent rate offered by federal agencies.

N.E.W.W.A. Moves Into New Headquarters

The New England Water Works Association has announced a move into new headquarters, at 613 Statler Building, Park Square, Boston. The new rooms provide convenient and comfortable quarters including reading rooms which contain a comprehensive selection of American and foreign technical publications and a complete file of New England Water Works Association Journals.

Professional Engineers Society Organized in Connecticut

A new professional body, the Connecticut Society of Professional Engineers, was organized at Stamford, Conn., on Aug. 31 to represent the united engineering profession in the state and "to advance and protect the economic and professional interests of the engineer." Willard S. Conlon, city engineer, Stamford, was elected president; Harry E. Harris and Z. F. Cappabianca, vice presidents; F. M. Brown, secretary, and C. S. Wendell, treasurer. Temporary headquarters have been established in the city engineer's office, Stamford.

As Connecticut has no license law for engineers one of the immediate objectives of the society is to continue the work of the Connecticut Conference of Professional engineers in working for the passage of such a law.

The new society has applied to the recently organized National Society of Professional Engineers for membership in that body as the representative of the professional engineers of Connecticut.

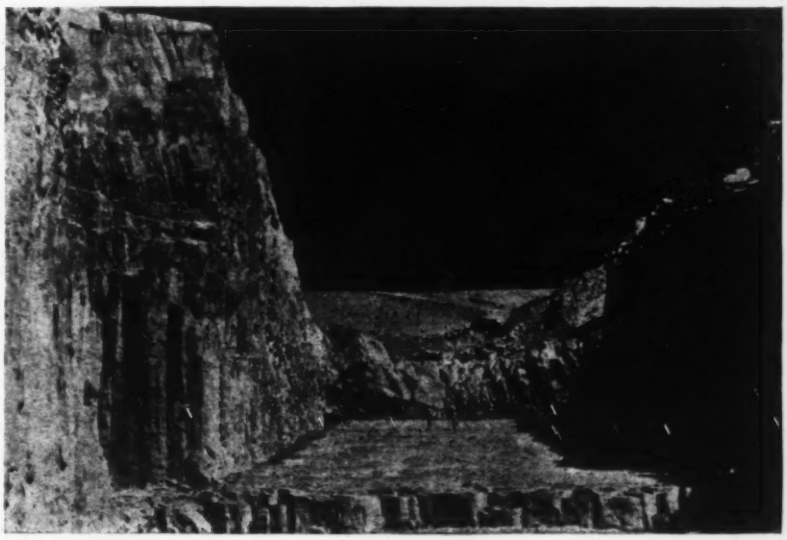
Membership is divided into two classes, members and associates. Members shall be legally licensed engineers, engineers who hold certificates fro n the National Bureau of Engineering Registration, or engineers who in the opinion of the board of directors are qualified for license. When a license law becomes effective in the state all members will be required to qualify. Associates shall be limited to licensed land surveyors and graduates of engineering schools or men of equivalent training who lack the practical experience required to secure a license under the provisions of the future law.

SITE OF THE 27-FT. SHIP LOCK AT THE BONNEVILLE DAM PROJECT

At an additional cost of $1,200,000 the Bonneville navigation and power project now under construction on the Columbia River will be provided with a ship lock of 27-ft. draft, in place of the barge lock called for in the original plan. The ship lock will be 76x500 ft. in plan and will have a 59-ft. single lift.

Particular attention has been focused on the lock depth to be provided, since Bonneville, 150 miles upriver from the Pacific Ocean, is the head of tide water and a channel for ocean-going ships has been maintained for many years as far as Portland. The possibility of ocean transportation for up-river points was primarily a question of securing a ship lock instead of a barge lock at Bonneville.

The view looks upstream through the deep lock excavation in basaltic formation.



Contractor Abandons Reading, Pa., Tunnel Job Charging Misleading Information

THE contractor on the new Maiden Creek water tunnel for Reading, Pa., Walter S. Rae of Pittsburgh, abandoned his contract on Aug. 28. As grounds for the abandonment he alleges misleading and incorrect bidding information was furnished by the city and claims non-payment of an estimate due on Aug. 1. Contract for the 2,358-ft. tunnel, an 8 ft. 9 in. bore with 12-in. concrete lining, and 500 ft. of open cut work crossing the creek, was let on March 31, 1934, for $179,253. It is one of six construction contracts let during the past year under a PWA loan of $2,500,000 for the improvement of the Reading water supply. At the time of abandonment, a shaft 80 ft. deep had been sunk at about mid point of the tunnel, 85 ft. of full size heading had been driven each way from bottom of shaft, a cofferdam half way across the Creek completed and considerable excavation work done at the junction of the Rae contract and that for a new conduit line to the new filtration plant. Also quantities of pipe and reinforcing not yet incorporated into the work had been purchased and delivered.

Location and borings

The site of the tunnel is in a limestone formation common to the Reading area. In 1927, 22 core borings were made along the then-proposed tunnel line, which was slightly to the east of the final alignment at the north portal, crossing the line near the quarter point and diverging to a point 150 ft. west at the south portal. All borings stopped at El. 255, above top of present tunnel line except at the extreme north end. Part of the charges of misleading information concern the numbering of these borings. Borings were originally numbered from north to south and core boxes correspondingly marked. On the contract drawings the numbering of the bore holes was reversed, starting from the south end. The logs of the bore holes shown in the plans were marked according to the new numbers, but the numbering of the core boxes, offered to bidders as bidding information, was not changed and therefore did not correspond to the log of the bore holes shown on the plan. The contractor claims that this fact was unknown to him until very recently. Chief Engineer A. R. O'Reilly of the Reading water board declined to comment, but the city attorney and a member of the city council claim this discrepancy was pointed out to all bidders at the time of bidding. The contractor states that in locating his shaft he examined the core boxes and selected the location of box No. 9 as best suited, and sunk his shaft near this hole as shown on the plans, but after sinking the shaft learned that core box No. 9 really corresponds with boring hole No. 13 as shown on the plan.

Shaft sunk

The log of the bore holes as shown on the contract drawings indicates solid limestone rock under an uneven surface 5 to 20 ft. below the surface. Logs of the borings mention only three classes of material: earth, mud seams and rock. A few mud seams are shown on the log, especially at the north end of the line, though no such seams are shown below top of tunnel. The specifications carry the usual statement that underground conditions as shown by the plans are not guaranteed. In the 80 ft. of depth of shaft, the contractor claims solid rock was not encountered until just above the tunnel bottom and in driving 170 ft. of heading solid rock was found only in the invert. Numerous wet sand streaks were encountered in the shaft and heading and quantities of clay and boulders were also found, none of which was indicated on the plan.

The tunnel proved to be very wet, one seam alone discharging an estimated 3,000 cu.ft. of water per minute. In substantiating the claim that the borings were misleading, the contractor alleges that core borings made recently for him by a reputable firm at the same points as the original borings do not agree with either of the original core borings or the log plotted on the plan. He states that the true nature of the underground conditions is revealed by the new borings.

In seeking relief from the bad ground conditions the contractor states that Mr. O'Reilly two weeks ago assented to a change of tunnel grade, either to raising the grade to get out of the water or lowering it to get in solid rock. A proposition submitted by the contractor suggesting a change of grade and asking for payment of tunnel already driven and the cost of new borings to determine the most suitable grade was later turned down by the city council and the contractor was ordered to continue work according to plans.

The contractor has received no payment for work done to date. The tunnel was let at a price per ft. complete, while the open cut work was let on unit prices and the cofferdam across the creek on a lump sum. While the contract provides that no allowance will be made in paying estimates for material bought and not yet incorporated in the work, the contractor claims that this clause is voided by the PWA ruling to the effect that 90 per cent of the materials bought for the job should be allowed in the estimate.

City's position

Mr. O'Reilly refused to make a statement concerning the city's side of the case, but in a recent letter to the city council he states that, as the contract is based on a price per ft. of the tunnel *complete*, he holds that nothing should be paid for tunnel work until a part of the tunnel is entirely complete. Therefore he contends the contractor is due nothing for tunnel work as none of the lining has been placed. In the same letter Mr. O'Reilly states that on Aug. 1, when an estimate was due the contractor that the sum of the work done at the open cut section at that time amounted to only $4,239. He points to specifications stating that an estimate will not be allowed unless the value of the work done since the preceding estimate exceeds $5,000. In his letter Mr. O'Reilly claims that the information submitted by the city was sufficient for the preparation of an intelligent bid. He points out that the cores were accessible to all bidders, locations of the borings were shown, the divergence of the original boring line from final tunnel line was indicated, and furthermore that the information is not guaranteed.

On Aug. 31, the city council, after conferring with the PWA state authorities, passed a resolution ordering the contractor to continue work and notified the bonding company, the U. S. Fidelity and Guaranty Company, that it would be held responsible for completion of the job. At the suggestion of the PWA engineers, an outside consulting engineer will be called in at once to make a study of the situation.

National Adjustment Board Grants 40-hr. Week Exemptions

Requests for exemption from application of the 40-hr. week provision of the construction code were considered by the executive committee of the National Construction Planning and Adjustment Board Aug. 31, in Washington and permission was given to work not more than 48 hr. per week in the following cases:

Construction of a dam in New Hampshire; construction work on a project located on islands in the Mississippi River; substructure for a railroad bridge over the Tombigbee River in Alabama; a tunnel in West Virginia.

These decisions were made under the provisions of Article III, Section 2 B 1, (a), (b) and (c) of Chapter I which enumerate specific reasons for which employees may be permitted to work in excess of 40 hr. in one week.

Referring to the same section of the code, the board refused permission to work employees more than 40-hr. per week on a courthouse in Kentucky and on a state highway project in Ohio. In the case of the courthouse project, it was stated that additional workers might be employed. On the highway work an adjustment in hours of work and rate of pay was suggested as the solution of the contractor's problem.

Beverly, Mass., Approves Plan For $500,000 Filtration Plant

The board of aldermen of Beverly, Mass., have voted authority for construction of the proposed $500,000 filtration plant at Wenham Lake to serve both Beverly and Salem. Work will begin in September and the project is expected to furnish employment for 400 men for 20 weeks. The two cities will pay for materials and equipment, Salem raising $200,000 by a bond issue and Beverly $100,000. Labor cost will be furnished by the ERA.

Chicago Plan Commission Approves Lake Front Rail Terminal

The Randolph St. lake front rail terminal in Chicago proposed in a report of the city council committee on terminals (*ENR*, Jan. 25, 1934, p. 112) has been approved by the Chicago Plan Commission. This action advances the project materially since for several years no major public improvement in Chicago has gone ahead without first receiving careful consideration by the engineering staff of the commission and subsequent ratification by the executive committee which is made up of a large number of influential citizens.

Los Angeles Advances Revenue From Utilities to General Fund

The Los Angeles municipal water and power commission has voted to advance $1,302,854 from water and power revenue to aid the general fund of the city, obviating the necessity of an increase in city taxes from the present rate of $1.68 per $100 assessed valuation. On recommendation of H. A. Van Norman, chief engineer of the bureau of water works and supply, the commission agreed to defray the $502,-854 of this year's St. Francis dam disaster bond charges and to make available to the general fund $800,000 from water department service charges.

The entire amount, with the exception of $35,000 which is to come from power revenues, will be realized from water revenues. In his recommendation to the commission, Mr. Van Norman stated that, although after the St. Francis dam disaster in 1928, the administration and civic leaders believed the whole city should share in the funding bond charges, the present economic emergency justified the water and power department's accepting the burden.

Sewage Plant Improvements Planned at Dallas, Texas

Objections to the continued dumping of raw and partially treated sewage by Dallas, Texas, into the Trinity River may force the immediate issue of more than $1,000,000 in bonds to construct a sewage disposal plant. No provision for such a bond issue was made in the 1934-35 budget which was submitted by city manager John N. Edy. Manager Edy has requested time for making experiments to determine the best type of plant.

Five years ago the state health department ordered the city of Dallas to enlarge its existing sewage disposal plant which was considered inadequate. Contamination in the Trinity River had resulted in complaints from communities and land owners below Dallas.

SOCIETY CALENDAR

AMERICAN ASSOCIATION OF PORT AUTHORITIES, 23rd annual convention, New York City, Sept. 10-13.

INTERNATIONAL CITY MANAGERS ASSOCIATION, annual conference, St. Louis, Oct. 15-17.

AMERICAN SOCIETY OF MUNICIPAL ENGINEERS, Annual Meeting, Rochester, N. Y., September 24-28.

INTERNATIONAL ASSOCIATION OF PUBLIC WORKS OFFICIALS, annual Meeting, Rochester, N. Y., September 24-28.

NATIONAL SAFETY COUNCIL, annual Meeting, Cleveland, Ohio, Oct. 1-5.

AMERICAN WELDING SOCIETY, fourteenth fall meeting, New York City, Oct. 1-5.

AMERICAN ROAD BUILDERS, annual convention, Washington, D. C., Jan. 8-11.

NEW ENGLAND WATER WORKS ASSOCIATION, annual fall convention, Boston, Mass., Sept. 18-21.

NEW YORK SECTION, AMERICAN WATER WORKS ASSOCIATION, fall meeting, Buffalo, Oct. 11-12.

WISCONSIN SECTION, AMERICAN WATER WORKS ASSOCIATION, annual Meeting, Wausau, Sept. 24-26.

WATER PURIFICATION OPERATORS IN MICHIGAN, 13th annual convention, Sept. 19-21 at Michigan State College, preceded by the water works school, Sept. 17-19.

Technical Questions Discussed at Central States Waterworks Meeting

TECHNICAL aspects of water supply and purification practice were given broad coverage by the papers presented at the meeting of the Central State Section of the A.W.W.A., which met jointly with the West Virginia Purification Conference at Wheeling, W. Va., Aug. 23 and 24. The joint meeting was a success in respect to both the papers presented and the attendance, all previous records in the latter regard being broken.

The highlight of the conference was the address by Harry E. Jordan, president of the parent association, whose subject was "The Value of the American Water Works Association." Mr. Jordan prefaced his remarks with a review of the general economic situation, and then made a plea for an improved utilization of public works funds, particularly in the field of waterworks improvement. He also strongly urged that the administration of waterworks facilities be removed from the sphere of politics.

Some interesting facts were brought out by A. R. Todd in his paper on "Recent Improvements in the Wheeling Water System." In addition to showing that metering the system in 1925 reduced pumpage by 45 per cent, he reported that complaints of taste in the water were largely eliminated by replacing the old dirty sand with new clean sand and by increasing the wash rate 25 per cent. Other improvements attained were as follows: The water was rendered non-corrosive by raising the pH from 7.8 to 9.4; the use of ammonia eliminated dead-end troubles and phenol tastes; activated carbon treatment was adopted to control odors and to render the sludge inert; the use of soda ash was introduced when the water is acid; and prechlorination was put into practice.

A paper on "Tastes and Odors in Water" by Martin J. Flentje was read in his absence by Mentor Hetzor. The paper stated that the public demand for higher quality in water has resulted in a large amount of study of the subject of tastes and odors and consequent improved methods. The fact was stressed that our lack of knowledge relative to the chemical character and constitution of the taste-and-odor producing bodies is what handicaps the study of preventative treatment.

Purification questions

Following the address by Harry E. Jordan, Prof. L. V. Carpenter gave the results of some studies on the "Effect of Road Oils and Tars on Water Supplies." This paper is supplementary to a previous work in which it was found that drainage from tarred roads produced objectionable tastes and odors in water supplies after chlorination. The test procedure employed was to take sample sections of road treated with varying amounts of primer and retread tar, to wash the sections with distilled water equivalent to one inch rainfall per hour, and to test the washings for tastes, phenols, and mixed cresols. It was shown that asphalt road washings do not contain any of the so-called "phenolics" and will not give objectionable tastes and odors in road washings after chlorination.

In a paper entitled "Nitrifying Bacteria in Water Supplies," Douglas Feben described the successful isolation of nitrifying bacteria from the raw and filtered water at Detroit, Mich. Concentrations of the organisms were found of from 10 to 1,000 per c.c. in the raw water. Washings of filter sand with distilled water showed about 1,000,000 of the organisms per c.c. The profuse growth within the filter bed was attributed to the use of ammonium sulphate in the water treatment, that salt serving as a nutrient medium for the bacteria. The nitrifying bacteria were found to be relatively unaffected by chlorine.

Pipe line corrosion

Charles E. Trowbridge presented an interesting case of internal pipe line corrosion due to stray electric currents. In this particular case complaints of discolored water were received from consumers served from an 8-in. line. Investigation disclosed the following pertinent facts: The character of the precipitate indicated that the corrosion was not ordinary corrosion of cast iron; the rate of corrosion was greater than what takes place even with active waters; raising the pH increased the activity; graphitic corrosion was evident in the pipe joints; the discoloration of the water was greater after periods of wet weather; iron bacteria had a tendency to occur in this section of pipe and not in other parts of the system. The 8-in. line lay between two street car systems connected with a shuttle line running parallel to the pipe. It was found that direct currents were flowing in the pipe line with the magnitude and direction of the current constantly changing. The condition was improved by double bonding all tracks, by laying some new rails and cables, and by installing insulating joints in the pipe line. The author's opinion is that interior corrosion of this pipe is due to the fact that the frequent reversals of current flow prevent polarization.

Mine sealing program

The concluding paper was an interesting summary of the mine-sealing program now under way in West Virginia, Pennsylvania and Ohio through the agency of the Interstate Stream Conservation Agreement cooperating with the U. S. Public Health Service. E. S. Tisdale, director of the West Virginia State Health Department, stated that although the work is only part completed, results are already manifest from several sources. The object of the program is to air-seal abandoned mine openings to prevent oxidation of the pyrites to sulphuric acid which finally finds its way into the streams. The wastes from the sealed mines are becoming less acid, waterworks operators in the vicinities observe an improved condition in their water supplies, and sportsmen are reporting a return of fish life. It is stated that the annual expense caused by the acid waters is many times the total cost of the preventive program.

At the business session of the conference, B. J. Lechner, of Erie, Pa., was elected the new chairman and Pittsburgh, Pa., was selected for the next meeting.

Obituary

WILLIAM J. RANDALL, building contractor of Buffalo, N. Y., died Aug. 13 at his home at the age of 74.

JOHN PETROSSI, 55, head of the John Petrossi Contracting Co., Rochester, N. Y., died as the result of an automobile accident on Aug. 10.

JOSEPH F. BAXTER, age 24, died June 8. He was associated with his father, O. G. Baxter, in the Baxter Engineering Co., Little Rock, Ark.

O. H. LANG, civil engineer and contractor of Moultrie, Ga., died at his home in that city Aug. 24 at the age of 46.

WILLIAM M. PENNIMAN, civilian engineer in the U. S. Engineers' district office at St. Louis for 40 years, died in that city at the age of 66. Mr. Penniman was a graduate of Dartmouth College.

WILLIAM A. GROVER, for 23 years city engineer of Dover, N. H., and for five years the head of the engineering department of Portsmouth, N. H., was killed Sept. 2 in a fall at his home in Dover. Mr. Grover was 59 years old. At one time during his professional work he was divisional engineer of the New Hampshire state highway department.

GEORGE R. DYER, chairman of the Board, the Port of New York Authority, died Aug. 31 in New York City at the age of 65. Mr. Dyer served for 23 years on the New York state bridge and tunnel commission, most of the time as chairman, and is credited with much of the work which initiated the Holland Tunnel.

P. W. CHABOT, for the past 11 years vice president of the John J. Casey Co., engineers and contractors of Pittsburgh, was killed Aug. 28 at New Philadelphia, Ohio, when the private plane he was piloting crashed at the take-off. Mr. Chabot was born in Wallace Mills, Ohio, 51 years ago and was associated with many prominent contracting firms of the West and South prior to coming to Pittsburgh.

FRANK WILLIAM DAVIS, well known British bridge engineer and for the past 35 years director of the Cleveland Bridge & Engineering Co., Darlington, England, died in that city recently at the age of 78. He joined the Cleveland organization in 1892. Among important projects carried out under his direction are several large airship docks in England, the high-level bridge over the Tyne River opened in 1906, and the Victoria Falls bridge and other highway and railroad structures in Africa. At the time of his death he was serving in a consulting capacity for the railroad bridge now under construction over the lower Zambesi River. Mr. Davis had made an extensive study of the problems incidental to compressed air work in deep foundations and received the Telford Premium of the Institute of Civil Engineers for a paper on this subject.

CONSTRUCTION STATISTICS OF THE WEEK

ENGINEERING awards for the short Labor Day week total $19,572,000 of which $3,504,000 is federal, $13,037,000 state and municipal and $3,031,000 private. For the rest of the year comparisons with 1933 will be with the increased rate of activity that began in September. It is still too early to compare the rate of contract awards with the last September acceleration but the first week is slightly below the average for the month a year ago after adjusting for the short week.

Sewerage and waterworks are both ahead of last week but all other classifications are below the high records established a week ago. Bridges total $1,662,000, streets and roads, $5,939,000, earthwork, irrigation, drainage, waterways, $2,970,000, industrial buildings, $1,227,000, commercial buildings, $117,000 and public buildings, $3,202,000.

The larger lettings for the week include highways by New York State, $1,909,000, and by Pennsylvania, $827,000; bridges by New York State, $608,000 and over the Mississippi River, by city of Hannibal, Mo., $591,000; dikes and revetments on the Mississippi and Missouri Rivers in Missouri and Nebraska, $1,310,000, $829,000 and $589,000; and a 10-mile gas pipe line from Mendota to Minneapolis for Minneapolis Gas and Light Co., Minneapolis, and 16 miles from Rosement to Mendota for Northern Material Gas Co., Chicago, estimated to cost between $1,500,000 and $2,000,000.

New capital was set back this week due to an excess of rescissions and reductions in PWA allotments over new non-federal allotments and to state and municipal bond sales too low to offset the decrease in the federal financing total outstanding.

CONTRACTS
(Thousands of Dollars)

	Weekly Average Week Sept. 1933	Prev. 4 Weeks	Sept. 6 1934
Federal Government	$6,020	$7,310	$2,504
State and municipal	12,413	10,499	13,037
Total public	$18,433	$17,809	$16,541
Total private	8,236	4,513	3,031
Week's total	$26,669	$22,322	$19,572
Cumulative to date:			
1933	$584,258	1934	$877,661

NEW PRODUCTIVE CAPITAL
(Thousands of Dollars)

1934	Week Sept. 6	Cumulative
State and municipal	$913	$228,971
PWA allotments, S&M.	—2,286	597,267
RFC loans, S&M	....	9,463
Corporate issues	....	18,081
PWA allotments, private	....	54,272
Total, Non-Federal	—$1,373	$908,054
PWA allotments, Federal Constr.	2,721	183,767
Total new capital	$1,348	$1,091,922
Cumulative to date:		
1933	$698,540	1934	$908,054

Note: These figures include private bonds, and stocks sold for productive purposes; state and municipal bonds for construction; PWA loans and grants to states and municipalities, including the special highway funds; PWA private loans, and allotments for Federal construction.

INDEX NUMBER

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Sept., 1933	175.48	84.35	Aug., 1933	73	32
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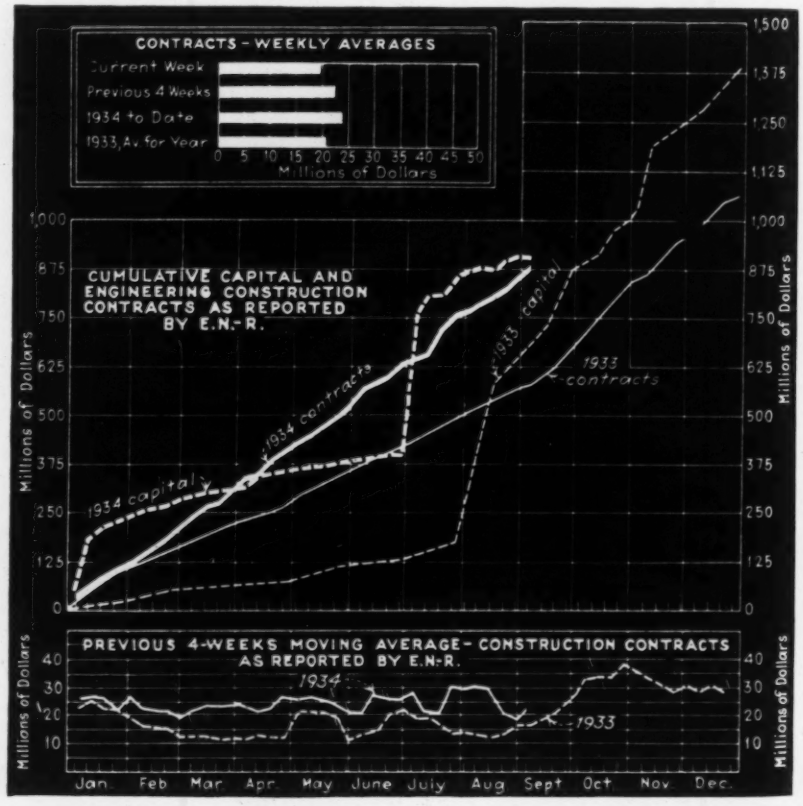
1932 (Av.)	156.97	75.45	1932 (Av.)	127	56
1931 (Av.)	181.35	87.17	1931 (Av.)	220	96.5



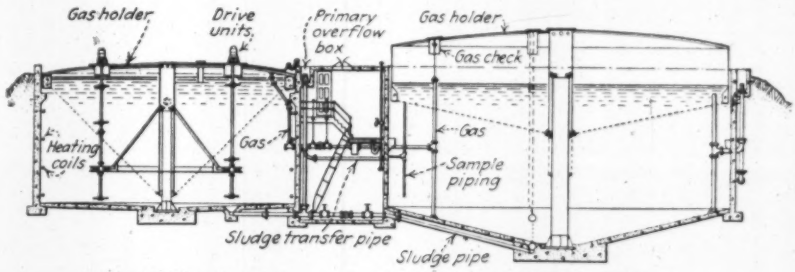
Construction Equipment and Materials

New Equipment Provides Multiple Stage Sludge Digestion

Multiple stage sludge digestion in sewage plants is provided for by the new multdigestion system announced by the Dorr Co., New York, N. Y. There is combined in one system rapid mixing, digestion and adequate provision for sludge and gas storage.

Between 80 and 90 per cent of the digestion takes place in a relatively small, heated, primary digester, equipped with a gas holder. Two or more enclosed motors, mounted on the gas holder, drive high speed turbo mixers that serve to keep the sludge in circulation. The sludge and gas are automatically transferred from the primary digester to the secondary tank, which is neither heated nor agitated, but is surmounted by a gas holder.

Supernatant liquor is discharged only from the second tank. This tank acts as a clarifier and sludge thickener. The extent of digestion in the primary tank reduces by about half the amount of solids going to the secondary.



The Dorr Multdigestion System

New Equipment in Brief

Blower. Roots-Connersville Blower Corp., Connersville, Ind., is now supplying some of its blowers, vacuum pumps and gas pumps connected through a variable speed drive to a constant speed motor.

Scraper. R. G. LeTourneau, Inc., Stockton, Calif., announces the addition of the 6-yd. and 8-yd. carryall scrapers to the LeTourneau line. The two new carriers have been built to supply the need for small scrapers to be used with 30-35 and 50 tractors. Except for capacity, they are identical in design with the LeTourneau 12-yd. carryall.

Chemical Feeder. D. W. Haering & Co., Inc., Chicago, Ill., announce the introduction of the new H-O-H Proportioning unit, an automatic proportioning machine for feeding liquid chemicals into liquid lines. The machine is entirely automatic. It will feed under varying conditions of pressure and in any amount desired. The principle of the Pitot tube is utilized.

Sump Pump. The M. L. Oberdorfer Brass Co., Syracuse, N. Y., has introduced the model B-2400 automatic electric sump pump and cellar drainer It is constructed of bronze and is equipped with a special ¼ hp. induction motor. The pump is an all bronze unit of centrifugal design with open impeller. The shaft is of stainless steel. It will pump 2,400 gal. per hour at a 1-ft. head and 400 gal. per hour at 20 ft.

Bulldozer. The Continental Roll & Steel Foundry Co., Chicago, Ill., has introduced the Continental-Wooldridge heavy-duty bulldozer. The blade can be tilted so that material that is being moved can be graded at the same time. The bulldozer has its own rectangular frame attaching to the tractor track through bulldozer rocker arms, brackets and the drawbars. The blade is powered both up and down, and is controlled by a hydraulic pump operated direct from the tractor power take-off.

Roof Decks. The Universal Metal Sections Co., Cleveland, Ohio, has introduced a steel roof deck designed with the idea of using one standard size section which is cold rolled from No. 16 gage hot rolled copper bearing strip steel. These sections are based upon the purlins at predetermined distances and upon them steel sheets with corrugations 1½x½ in. are fastened. Insulation and waterproofing are then applied.

Aluminum Paint. Aluminum Industries, Inc., Cincinnati, Ohio, has developed an aluminum paint which it claims spreads better, gives more thorough coverage and fuller protection. The company states that aluminum bronze powder particles tend to group together in clusters, having from 40 to 50 particles in a lump. In the manufacture of the new paint, the air imprisoned within the lump is released by applying a 31 in. vacuum.

New Publications

TYPE CH ALL METAL CLOTH SCREEN DUST COLLECTOR. Bulletin No. 197. 8½x11, 24 pages. Pangborn Corp., Hagerstown, Md.

DREDGING PLANT AND HYDRAULIC MACHINERY. Bulletin 151. 8½x11, 36 pages. Morris Machine Works, Baldwinsville, N. Y.

KENNEDY NEWTYPE WATER GATE VALVE. Bulletin 32. 8½x11, 6 pages. The Kennedy Valve Manufacturing Co., Elmira, N. Y.

ROAD SURFACE STABILIZATION. Bulletin No. 1. 6x9. 20 pages. Solvay Sales Corp., New York, N. Y. Materials and methods for construction and maintenance of low cost stabilized roads.

ROAD SURFACE STABILIZATION. Bulletin No. 3. 6x9. 24 pages. Solvay Sales Corp., New York, N. Y. Methods and equipment for sampling and testing soils and calculating stabilized soil mixers.

SINGLE STAGE CENTRIFUGAL BLOWER AND EXHAUSTER. Bulletin 120-B10. 8½x11. 4 pages. Root-Connersville Blower Corp., Connersville, Ind.

AMERICAN EQUIPMENT. 8½x11, 14 pages. American Hoist & Derrick Co., St. Paul, Minn.

THE AMERICAN EAGLE CRANE. 8½x11, 10 pages. American Hoist & Derrick Co., St. Paul, Minn.

Business Notes

HERCULES POWDER CO., Wilmington, Del., announces the appointment of William R. Ellis as assistant general manager of the explosives department.

REPUBLICAN STEEL CORP., Youngstown, Ohio, announces that L. S. Hamaker, sales promotion manager, has been advanced to the position of vice-president and general manager of the Berger Manufacturing Co., Canton, Ohio, wholly owned subsidiary of Republic.

UNIVERSAL ATLAS CEMENT CO., Chicago, Ill., announces the appointment of C. A. Webb as sales manager. He will have charge of the Chicago metropolitan territory.

Road Finishing Machine Operates at High Speed

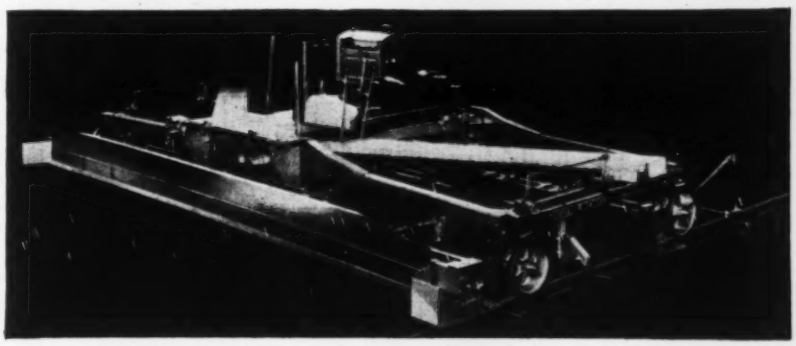
A new automatic, high speed road finishing machine has been announced by the Jaeger Machine Co., Columbus, Ohio. The machine is designated the Jaeger-Lakewood Type "D" finisher.

Box-type 12 in. screeds are moved by double equalizing connecting rods with link motion, and with toggled radius rod construction which the maker states eliminates all radial swing. Positive, automatic power lift raises and lowers the heavy screeds in two seconds. Each screed is independently controlled.

The manufacturer states that speeds of 8 to 12 ft. per minute forward and 40 to 90 ft. per minute in reverse can be obtained.

The machine is furnished with a 4 cylinder 10 to 15 hp. gasoline engine or with gas-electric power.

Jaeger-Lakewood finishing machine



BUSINESS SIDE OF CONSTRUCTION

August Contract Average Declines Eight Months Hold 51 Per Cent Gain

THE summer recession on volume of engineering construction awards which characterizes the contract volume curve appeared this year in the first four weeks of August. The fifth week, although the third highest for the year, was not high enough to raise the weekly average for the month above $21,823,000 of which $17,782,000 is public and $4,041,000 private. The figures compare with corresponding awards in 1933 as follows: total for average week $14,813,000; public, $7,900,000; private, $6,913,000. Thus, while August awards declined from July volume this year they were 50 per cent ahead of August last year on dollar value. Adjusted for the higher cost index the gain over last year is 29 per cent.

Street and road contracts registered a new low for this year, commercial buildings remained at the low level of last month, industrial buildings declined below last month's higher awards and public buildings likewise are below last month's higher volume in this class.

Territorially, moderately increased awards are registered in Middle Atlantic, West of Mississippi and Middle West territories while Far West drops far below its record total of last month and New England and South volume declined slightly.

New Capital

The net increase in the new capital reported for August was $43,000,000 for the five weeks of which $20,000,000 was made up of state and municipal bond sales, $18,000 in corporate issues and the balance in PWA financing.

Material Notes

Cement—Portland cement production for July was 8,134,000 barrels and shipments from mills, 7,893,000 barrels as reported by the Bureau of Mines. This is a decrease in production of 5.5 per cent and in shipments of 9.2 per cent, compared with July, 1933. The ratio of production to capacity in July, 1934, declined to 35.7 from 39.8 reported for June and 37.6 for July, 1933.

Steel—The operating rate of steel companies reported by American Iron and Steel Institute averaged 23.4 per cent of the steel capacity of the industry for the first four weeks of August.

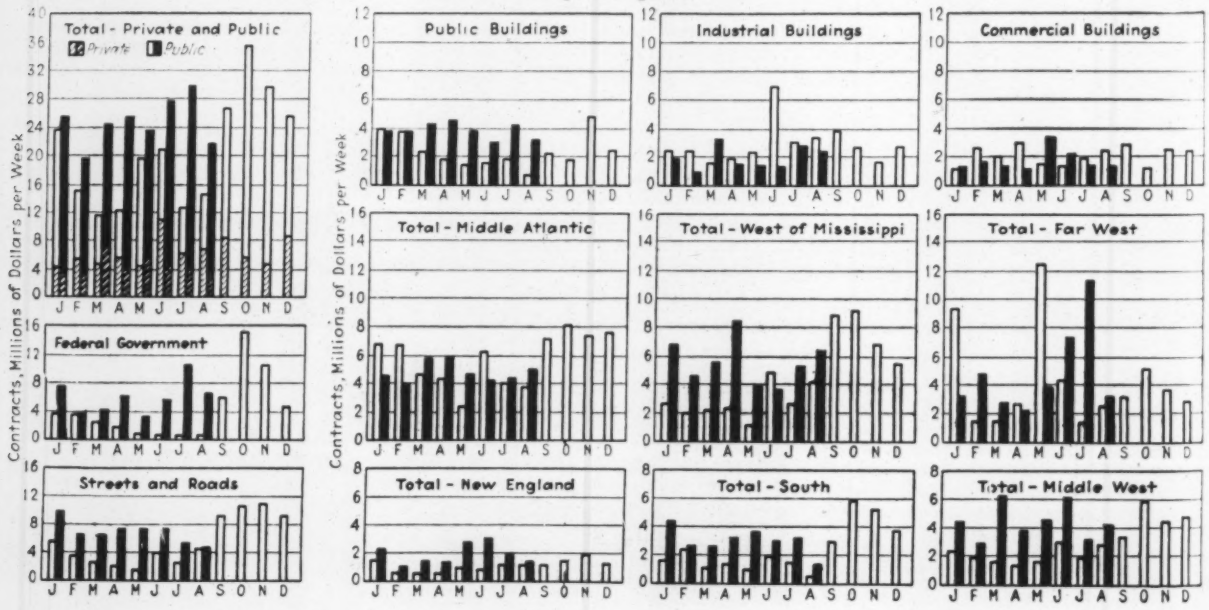
A midsummer slump in bookings of structural steel for fabrication reversed the improved trend of new business which had been recorded during the first half of 1934. July shipments, according to reports received by the American Institute of Steel Construction, were approximately 59 per cent larger than for the same month

ENGINEERING CONSTRUCTION CONTRACTS REPORTED IN AUGUST, 1934

Five Weeks—Thousands of Dollars (000 omitted)

	New England	Middle Atlantic	South	Middle West	West of Mississippi	Far West	United States August, 1934	United States Eight Months 1934	United States Eight Months 1933	Canada August, 1934
Public Works										
Waterworks	394	503	459	406	1,811	720	4,293	48,411	59,347	234
Sewers	568	942	301	1,225	2,321	613	5,970	38,823	11,318	54
Bridges, public	1,593	2,874	321	1,586	802	338	7,514	62,411	55,684	86
Earthwork and waterways	383	346	877	649	14,191	9,329	25,775	29,255	26,959	515
Streets and roads	980	3,934	3,247	6,553	7,163	2,069	23,946	236,869	117,208	1,274
Buildings, public	1,008	6,856	1,589	1,774	3,413	1,291	15,931	131,706	72,169	2,513
Unclassified, public	112	3,057	83	263	604	1,362	5,481	44,712	10,478	537
Total public	5,038	18,512	6,877	12,456	30,305	15,722	88,910	692,187	353,163	5,218
Federal gov't. (included in other classifications)	1,093	2,424	1,974	1,125	14,756	10,694	32,066	201,429	60,551	...
Private										
Bridges, private	.....	803	.....	.....	.....	18	821	7,839	4,997	...
Buildings, industrial	588	1,598	224	7,199	339	803	10,751	69,503	107,094	91
Buildings, commercial	1,327	3,947	.....	833	533	45	6,685	60,413	68,069	200
Unclassified, private	447	143	20	800	535	3	1,948	28,147	36,738	...
Total private	2,362	6,491	244	8,832	1,407	869	20,205	165,902	216,898	291
August, 1934 (5 weeks)	**7,400**	**25,003**	**7,121**	**21,288**	**31,712**	**16,591**	**109,115**	.....	.....	**5,509**
July, 1934 (4 weeks)	7,826	17,730	13,019	12,940	21,309	45,176	118,000	.....	.....	1,940
August, 1933 (5 weeks)	5,900	18,824	2,502	13,948	20,380	12,509	74,063	.....	.....	4,342
Eight months, 1934	67,176	170,206	104,429	157,864	193,322	165,092	.....	858,089	.....	29,606
Eight months, 1933	32,886	169,995	47,573	72,301	98,065	149,241	.....	.....	570,061	18,340

CONTRACTS REPORTED - WEEKLY AVERAGES - 1933-1934



last year. Reports from 80 per cent of the industry indicate that the bookings during July were about 29 per cent less than the average monthly bookings during the previous six months, and 1 per cent less than for July, 1933.

Lumber—During the first week of August, following the reduction of about 10 per cent in building lumber prices, orders were higher than in any week of the previous nine. Bookings, although declining from this rate, continued heavy for the next two weeks but fell off materially in the last two weeks of August. Shipments continued very heavy during August while movement continued of lumber tied up by the longshoremen's strike. Production continued heavy. In the last week of August, although less than during the preceding two weeks, it was heavier than at any time since May, according to the National Lumber Manufacturers Association.

Labor

The reports on "Trend of Employment" by U. S. Department of Labor, Bureau of Labor Statistics, for May indicated an increase in total employment of 10.1 per cent in public and private building construction not aided by Public Works funds, in payrolls an increase of 12.2 per cent and in man-hours worked an increase of 11.2 per cent. For June total employment in this classification showed a decline of 0.3 per cent, payrolls a decline of 1.2 per cent and man-hours worked an increase of 1.2 per cent. The May figures are based on returns from 11,258 firms and the June report on returns by 11,346 firms.

On construction projects financed either wholly or in part from the Public Works fund during the month ending May 15, the Department of Labor reports that nearly 490,000 people were employed, an increase of nearly 120,000, compared with April. In the month ending June 15, this total had increased to 583,000 workers.

Settlement is reported on a number of labor controversies. The terms (minor concessions on both sides) under which the Mid-town tunnel strike in New York City was settled are reported in the news pages of this issue. In New York an agreement under the NRA was signed effective August 13 whereby wages at the rate of $1.50 an hour and a forty hour week for bricklayers in New York City and the western part of Long Island are established in the first collective bargaining agreement in the construction industry. This agreement expires Feb. 28, 1936, or sooner if emergency relief is not extended. On three-shift work, the second and third shifts will receive 8 regular hours pay for 6 actual hours of labor. Sixty similar regional agreements are pending before the NRA which will affect various trades in different sections. In Rochester the code wage scale for bricklayers will be $1.25 an hour, 8 hours a day, 5 days a week.

At Buffalo federal dredging is going ahead, after a two months' strike beginning June 1, with the acceptance by linemen and firemen in the Buffalo, Chicago and Duluth locals of the employers' proposal of a 40-hour week and monthly wage scale of $147.50. They have, however, rejected the 48-hour week and monthly wage scale of $157.50 for private labor. Captains and engineers are reported ready to accept an $8.50 monthly increase as proposed by the employers. The licensed men will work a 48-hour week until March 31, 1935, when their contract with employers expires. They then are expected to get a 40-hour week. The remaining 8 locals were expected to follow suit.

On the high speed line across the Delaware River Bridge 400 Camden workers walked out August 23 asking that "men doing skilled work should be paid accordingly." The wage scale includes skilled labor at $1.20 an hour and unskilled at 50 cents but the men claim that only two per cent of the workers have been classed as skilled. The Construction Workers Industrial Union, truck drivers, mechanics, carpenters and laborers, demands higher wages and union recognition. The union has requested federal intervention.

At Washington, masons were on strike at the Woodrow Wilson High School, demanding that rubble stone setters be paid the same rate as cut stone setters. The contractor "figured the job" at $1.00 per hour but paid $1.10 "to avoid friction" with labor. The strikers ask $1.50. District Commissioners ruled in favor of the strikers. The contractor plans to appeal to the Labor Department Board of Conciliators. At Washington also, the Building Laborers Local 74 filed notice on August 28 that on construction work started after September 10, union workers will not work for less than 60 cents per hour. No contract for building labor is now in force but the PWA minimum is 45 cents per hour.

In New York the five-week strike of 5,000 painters, members of District Council 9 of the Brotherhood of Painters, Decorators and Paper Hangers, was settled by the restoration of the old wage scale of $9.00 a day for 7 hours work. Employers had sought to cut the wage $1.00 a day and raise the schedule of hours per day to eight.

EN-R Cost and Volume Index

The *Engineering News-Record* Construction Cost Index for August is 200.58. This increase is due in part to an increase in the common labor wage rate average and in part to an increase in wholesale price of heavy construction timbers. At the present time a doubly artificial price structure exists in the lumber industry, first, on account of the increases written into the lumber codes, and second, on account of the lowering of prices on certain classes of lumber going into home construction.

Analysis of the price trend of the class of lumber used in the cost index shows that it is now 41 per cent higher than in June, 1933. A similar analysis of other lumber prices shows in general a similar trend until August when the price cut on housing lumber went into effect. This price curve drops for August and September. Before this drop the small size lumber was 51 per cent higher than in June, 1933, and after the drop 34 per cent higher compared with corresponding increases in the lumber price used in the *EN-R* Cost Index of 37 per cent and 41 per cent respectively. Users of the Cost Index may wish to make allowance for this unusual situation. The amount of increase contributed to this month's index by the higher lumber price is 1.20.

INDEX NUMBER

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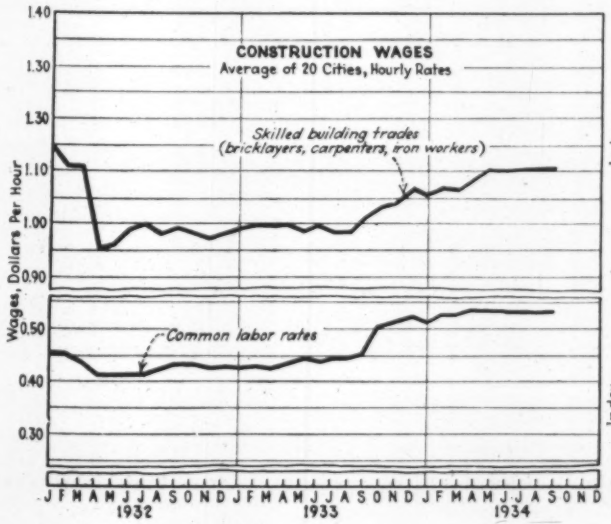

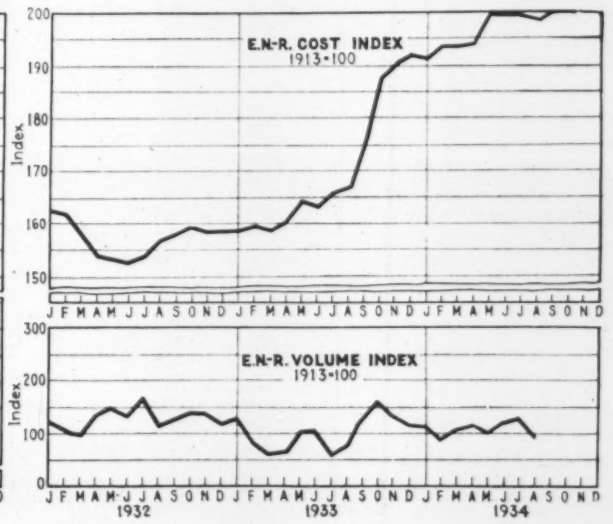
E.N-R. COST INDEX
1913=100
Index
200
190
180
170
160
150
J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D
E.N-R. VOLUME INDEX
1913=100
Index
300
200
100
0
J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D
1932
1933
1934

CURRENT PRICES OF CONSTRUCTION MATERIALS

CEMENT, AGGREGATES AND READY-MIXED CONCRETE

	PORTLAND CEMENT — Per bbl., carload lots, f.o.b. city, including cost of bags			SAND AND GRAVEL — Per ton, carload lots, f.o.b. city			CRUSHED STONE — Per ton, carload lots, f.o.b. city		CRUSHED SLAG — Per ton, carload lots, f.o.b. plant		CONCRETE — Ready Mixed 1:2:4, 50c.y. or more, delivered
	Cloth Bags*	Paper Bags	Bulk	Gravel, 1½ in.	Gravel, ¾ in.	Sand	1½ in.	¾ in.	1½ in.	¾ in.	
Atlanta	$2.79	$2.54	$2.34	$2.31	$2.31	$1.64	$1.69	$1.92	$1.80	$1.80	$9.00
Baltimore	2.66	2.41	2.21	1.80‡	2.00‡	1.25‡	1.80‡	1.80‡	2.25	2.25	7.35
Birmingham	2.55	2.30	2.10	1.75	1.75	1.40	.85	.85	.90	1.15	5.45
Boston	2.72	2.47	2.27	1.50	1.50	1.10	1.50	1.50	.....	.....	6.50
Chicago	2.85‡	2.60‡	2.40	2.60‡	2.60‡	2.05‡	2.60‡	2.60‡	.....	.....	.....
Cincinnati	2.57	2.32	2.12	1.20	1.20	1.10	1.80	1.80	.....	.....	6.70
Cleveland	2.45	2.20	.....	1.55	1.55	1.45	1.60	1.60	1.75	1.75	8.85
Dallas	2.45	2.20	2.00	1.55	1.55	1.30	2.00	2.15	.....	.....	6.35
Denver	2.98‡	.....	.....	1.85	.....	1.25	.....	.....	.....	.....	.....
Detroit	2.25	2.00	1.80	1.15	1.05	1.00	1.10	1.10	1.30‡	1.30‡	6.00
Kansas City	2.50	2.25	2.00	.75p	.75p	.65p	1.30p	1.30p	.....	.....	7.00
Los Angeles	2.90	2.62	.....	1.90	1.90	1.40	1.90	1.90	.....	.....	6.70
Minneapolis	2.85	.....	2.40	1.00p	1.00p	.25p	1.00	1.00	.....	.....	6.50
Montreal	.....	1.70	.....	.....	1.50	1.40	.....	1.20	.....	.....	.....
New Orleans	2.42	2.17	.....	1.70	1.70	1.45	.....	.....	.....	.....	7.65
New York	2.90‡	2.65‡	.....	1.50†k	1.50†k	1.00†k	1.75†k	1.85†k	.....	.....	8.00
Philadelphia	2.60	2.35	.....	2.00‡	2.25‡	1.80‡	1.75‡	2.00‡	1.75‡	1.75‡	8.25
Pittsburgh	2.45	2.20	1.60	1.50‡	1.50‡	1.70‡	2.25‡	2.25‡	1.25	1.25	7.00
St. Louis	2.42	2.17	.....	1.75‡	1.75‡	1.75‡	1.75‡	1.75‡	.75§	.75§	7.50
San Francisco	2.72	2.52	2.20	1.35	1.35	1.35	1.50	1.50	.....	.....	7.53
Seattle	2.95	2.70	.....	1.50†	1.50†	1.50†	.....	.....	3.00	3.00	7.00

*Includes 40c. per bbl. for bags, 10c. allowed for each returnable bag. †Per cu. yd. ‡Delivered. §F.o.b. Granite City, Ill. kBarge lots alongside dock. pf.o.b. plant

CURRENT MILL PRICES CEMENT TO DEALERS, CARLOAD LOTS, F.O.B. MILL

Charge for bags not included. For cloth bags, add 40c. per bbl.; 10c. refund allowed for each returnable bag; for paper bags add 15c. per bbl., not refundable.

	Bagged	Bulk		Bagged	Bulk		Bagged	Bulk
Alpena, Mich	$1.65	$1.60	Ironton, Ohio	$1.60	$1.55	North Birmingham, Ala	$1.75	$1.70
Buffington, Ind	1.60	1.55	Iola, Kans	1.70	1.65	Richard City, Tenn	1.85	1.80
Crestmore, Calif	1.72	.....	La Salle, Ill	1.60	1.55	Saginaw, Mich	1.65	1.60
Dallas, Tex. (Inc. 5c. tax)	1.80	1.75	Limedale, Ind	1.60	1.55	Steelton, Minn	1.80	1.75
Hannibal, Mo	1.60	1.55	Mason City, Ia	1.70	1.65	Universal, Pa	1.65	1.60
Hudson, N. Y	1.75	1.70	Norfolk, Va	1.76	1.71	Waco, Tex. (Inc. 5c. Tax)	1.80	1.75
Independence, Kans	1.70	1.65	Northampton, Pa	1.65	1.60	Wyandotte, Mich	1.60	1.55

STRUCTURAL CLAY BUILDING TILE, BRICK AND LIME

	STRUCTURAL CLAY TILE — PARTITION — Per M, lots of 2,000 pieces or over, delivered			STRUCTURAL CLAY TILE — LOAD BEARING — Per M, lots of 2,000 pieces or over, delivered			BRICK — Per M, in quantity, delivered		LIME — Per ton, in paper, carload lots, delivered		
	3x12x12 in.	4x12x12 in.	8x12x12 in.	8x12x12 in.	10x12x12 in.	12x12x12 in.	Common backing	Straight hard	Hydrated finishing	Common hydrated	Pulverized or lump
Atlanta	$84.27	$89.87	$168.40	$189.50	$243.20	$277.90	$13.22	$13.50	$17.50	$12.10	$12.10
Baltimore	77.50	82.50	154.00	185.00	216.00	267.00	13.00	17.00	16.50	11.00	19.00
Birmingham	84.25	90.00	156.00	180.00	215.00	242.00	15.00	22.50	3.00§	1.75§	2.25k
Boston	85.30	91.15	171.00	193.50	239.60	273.40	14.50	17.00	21.20	15.46	3.62§k
Chicago	66.00	70.40	132.00	.....	.....	.....	10.20	11.20	18.00	13.40	14.00
Cincinnati	69.95	74.65	139.90	139.90	174.65	199.20	17.50	17.50	15.97	12.48	.....
Cleveland	62.50	66.50	124.50	149.50	188.00	214.75	17.50	17.50	17.20k	14.50k	2.65k§
Dallas	74.75	80.00	156.50	175.00	199.00	228.00	13.50	28.00	13.20	14.50	.....
Denver	75.00	80.00	135.00	135.00	185.00	220.00	5.50–12.50	16.50	30.00	22.00	.....
Detroit	63.60	67.80	127.10	230.00	270.00	330.00	11.50	12.50	16.50	14.00	21.06
Kansas City	64.00	68.00	122.00	164.00	168.00	199.00	11.00	23.50m	.60‡e	.60‡e	2.35§
Los Angeles	77.50	94.25	134.00*	188.00	232.50	311.50	11.50	14.00	18.70	.....	19.70
Minneapolis	78.25	84.00	143.00	165.00	173.00	240.00	13.10	21.00	25.50	21.00	21.00
Montreal	.....	100.00	.....	.....	240.00	.....	14.75	21.50	22.00	12.75	.....
New Orleans	58.20	62.05	115.95	158.90	193.20	.....	13.50	.....	16.60	12.95	.....
New York	84.00	90.00	135.00*	193.30†	238.80†	295.60†	14.00	.....	20.80	16.00	20.80
Philadelphia	80.50	85.90	161.00	182.50	235.00	272.00	15.00	18.00	16.35	11.25	10.75
Pittsburgh	72.65c	77.45c	145.20c	164.60c	180.50c	206.25c	17.50	22.00	16.69	14.10	16.66
St. Louis	62.00	65.00	120.00	165.00	187.00	214.00	15.00	18.00	.48‡	.38‡	2.80e
San Francisco	84.00	94.50	225.00	.....	.....	.....	15.00	18.00	22.50	21.50	2.05p
Seattle	84.00	95.00	180.00	.....	.....	.....	15.50d	15.50	30.00	25.00	3.00e

*6x12x12 in. †F.o.b. Perth Amboy, N. J. ‡Per sack. §Per bbl. kLCL. pPer bbl. 180 lbs. cLess 5% cash 15 days. dless $1 cash 15 days. elump.

ROAD SURFACING MATERIALS

	PAVING BRICK AND BLOCKS			PAVING ASPHALT		ASPHALT BINDERS—FLUXES		CUTBACK ASPHALT		ROAD OILS	ASPHALT EMULSION	
	Granite per M, lots of 50,000, 4x4x8 in., f.o.b. city	Brick per M, 3x8½x4 in., carload lots f.o.b. city	Wood per sq.yd., 3½ in., 16-lb. treat, f.o.b. city	Per ton, less than 80 penetration, f.o.b. city Tank car	Drums	Per gal., 80-300 penetration, f.o.b. city Tank car	Drums	Per ton, f.o.b. city Tank car	Drums	Per gal., f.o.b. city Tank car	Per gal., f.o.b. city Tank car	Drum
Atlanta	$ 80.00	$35.00	$2.25	$18.20	$23.41	$0.0728	$0.0989	$20.45	$27.28	$0.0728	$0.105	$0.105
Baltimore	125.00	44.00	2.25	17.00	22.00	.07	.095	.08†	.115†	.....	.....	.....
Birmingham	125.00	24.00		18.00	23.00	0.778	.1028	.082†	.112†	.....	.06	.....
Boston	85.00	34.00	2.40	16.00	21.00	.075	.10	.09†	.12†	.075	.09	.125
Chicago	138.00	42.00	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Cincinnati	100.00	37.00	.....	18.00	22.00	.09	.....	18.50	.....	.07	.08	.....
Cleveland	100.00‡	32.75	2.95	20.00	24.50	.075	.09	.075†	.049†	.06	.085	.10
Dallas	.....	26.00	.....	13.88	20.30	.057	.082	15.65	21.76	.055	.12	.16
Detroit	.....	35.50	.....	19.67*	24.87*	.....	.....	17.00	22.50	.....	.....	.....
Kansas City	.....	32.50	2.75	18.00	24.00	.065	.1005	.09†	.125†	.05	.05	.085
Los Angeles	.....	48.50	.....	10.34	14.50	10.34§	14.50§	10.34	.....	.042	.06	.12
Minneapolis	.....	.....	2.50	18.10	24.60	.098	.098	21.75	34.55	.048	.....	.....
Montreal	.....	110.00	.....	14.00	19.66	.07	.093	19.00	26.50	.07	.125	.155
New Orleans	100.00	35.00	.....	14.50	18.50	.065	.09	.07†	.10†	.....	.....	.....
New York	133.00§	50.00	2.64	17.00	22.00	.07	.095	.08†	.115†.	.....	.085	.12
Philadelphia	115.00	45.00	2.25	15.00	20.00	.06	.....	.07†	.10†	.06	.....	.....
Pittsburgh	115.00	40.00	.....	19.00	24.00	.0775	.1125	.086†	.121†	.0675	.....	.....
St. Louis	105.00	35.00	2.00	19.50	24.50	.08	.105	.09†	.12†	.04	.09	.1255
San Francisco	.....	50.00	.....	12.00	18.00	12.00§	18.00§	12.50§	23.00§	.04	.0575	.117
Seattle	.....	47.50	.....	18.00	23.85	18.00§	23.10§	15.00	.....	.03	.1929§	34.20§

Note: Paving asphalt, tank caror boat, f.o.b. Maurer, N. J., per ton, Bermudes, $25.00; Trinidad, $21.00 *Per sq. yd. †Per gallon. ‡4½x6x5½in. §Per ton. §4x5x9-in. Av. kMexican.

CURRENT PRICES OF CONSTRUCTION MATERIALS

IRON AND STEEL PRODUCTS—BASE MILL PRICES

	STRUCT. SHAPES-PLATE Per 100 lb., carload lots	REINF. BARS Per 100 lb., ½-in. billet, carload lots	RIVETS Per 100 lb., ½-in. structural carload lots	WIRE NAILS Per 100 lb., base, carload lots	SHEET PILING Per 100 lb. base, carload lots	STEEL RAILS Per Gross Ton: Standard	Light	Re-rolled	TRACK SUPPLIES Per 100 lb., carload lots: Angle bars	Std. spikes	Tie plates	Track bolts
Birmingham	$1.95	$2.00	.....	.....	.....	$36.375	.....	.....	$2.55	$2.40	$1.90	$3.55
Chicago	1.85	2.10	$3.00	.....	$2.25	36.375	$35.00	$34.00	4.10	3.50	1.90	4.65
Pittsburgh	1.80	2.05	2.90	$2.60	2.15	36.375	35.00	34.00	2.55	2.40	1.90	3.55

IRON AND STEEL PRODUCTS—LOCAL PRICES F.O.B. WAREHOUSE

	STRUCTURAL SHAPES Per 100 lb., base price	REINFORCING BARS Per 100 lb., ¾ in., base price: New billet	Rail steel	EXPANDED METAL LATH —Per 100 sq.yd., carload lots— Std. diamond mesh, 3.4 lb	Std. ribbed 3.4 lb.	WELDED FABRIC REINFORCING —Per 100 s.f., carload lots— 4x16 in., No. 5 & 10 wires	4x12 in., No. 8 & 12 wires	6x6 in., No. 6 & 6 wires Per sq.yd.	SHEET PILING Per 100 lb. base price
Atlanta	$3.63	$2.48	$2.33	$21.00	$24.00	$1.60	$1.21	$0.151	$2.65
Baltimore	2.90	2.75	2.55	20.00	25.00	1.46	1.12	.137	2.70
Boston	3.52	3.03	2.2125	20.50	24.50	1.50	1.14	.142	2.30
Chicago	3.20	2.10	1.95	22.00	26.00	1.45	1.12	.137	2.25
Cincinnati	3.40	3.25	3.25	25.01	29.50	1.44	1.11	.135	.....
Cleveland	3.16	2.60	2.45	22.00	25.00	1.44	1.11	.135	.....
Dallas	4.00	3.28	3.13	24.50	26.50	1.70	1.27	.161	2.985
Denver	3.92	3.66	.....	24.50	30.50	1.70	1.27	.161	.....
Detroit	3.40	2.885	2.885	24.75†	30.00†	1.48	1.13	.139	2.25
Kansas City	2.78	2.75	.....	19.50	21.50	1.54	1.17	.145	2.65
Los Angeles	3.10	2.95	.....	23.00	27.50	1.90	1.40	.18	2.50
Minneapolis	3.45	2.82	2.67	22.00	26.00	1.58	1.20	.149	2.55§
Montreal	3.50	3.00	2.75	.....	.....	.....	.....	.....	3.20
New Orleans	.....	.....	.....	19.15	23.00	1.54	1.20	.149	.....
New York	3.37	2.82	2.67	20.00	22.00	1.48	1.13	.139	2.48
Philadelphia	2.005	2.34	2.19	20.00	23.50	1.44	1.11	.135	2.44
Pittsburgh	1.80‡	2.05‡	1.90‡	20.75‡	23.03‡	1.44	1.11	.135	2.15
St. Louis	3.44	2.44	2.29	20.00	23.00	1.46	1.12	.137	2.25
San Francisco	3.55	2.475	2.35	23.00	28.00	1.90	1.40	.18	2.60
Seattle	3.55	3.50	.....	.....	.....	1.90	1.40	.18	.....

‡Base Mill Price. Note: Shapes, bars and piling subject to quantity discounts. §Mill Price plus freight to Minneapolis. †f.o.b. delivered.

PAINTS AND ROOFING SUPPLIES

	WHITE LEAD Per 100 lb. keg in oil, f.o.b.	READY-MIXED PAINT Per gal., drums, f.o.b.: Graphite*	Aluminum†	Ferric Oxide‡	ROOFING SUPPLIES Carload lots, f.o.b. factory: Rolls, slate surfaced, 85-90 lb., per sq.	Asphalt felt, per 100 lb.	Tar felt, per 100 lb.	Asphalt coating, per gal.	Tar pitch, 350-lb. bbl., per ton
Atlanta	$11.50	$1.60	$3.10	.....	$1.99	$1.97	$2.90	$ .36	$25.40
Baltimore	11.00	1.40	2.25	$1.90	2.52	2.48	2.48	.455	23.00
Birmingham	11.50	2.35	2.35	1.85	1.95	1.79	.....	.36	23.00
Boston	10.00	1.65	2.60	.04½x	2.15	3.33	3.33	.44	20.00
Chicago	11.00	1.85	2.45	1.30	1.60	1.59*	1.59*	.24	20.00
Cincinnati	11.00	1.40	3.00	1.55	2.40	2.39*	2.39*	.36	21.00
Cleveland	11.00	1.65	2.35	1.30	1.60	2.45*	2.45*	.24	22.00
Dallas	12.00	1.80	2.41	.....	3.15*	2.56§	2.56§	.43	30.25*
Denver	11.75	2.55	.....	.....	2.17	3.00	3.00	.50	30.00
Detroit	11.00	1.55	2.35	1.30	1.75	2.35	2.50	.37	27.00
Kansas City	11.12½	1.85	2.25	1.60	1.75	1.85	2.15	.33	26.75
Los Angeles	10.00	1.60	2.25	2.30	2.00	1.50	.....	.45	.....
Minneapolis	11.12½	.....	.....	.....	1.60	1.79*	1.79*	.29	25.10
Montreal	9.40	1.70	3.45	1.65	2.00	2.62	2.02	1.40§	1.52§
New York	11.00	1.70	2.35	1.48	1.60	1.79*	1.79*	.232	22.00
Philadelphia	9.90	1.50	2.05	1.50	1.68	1.85*	1.85*	.34	22.00
Pittsburgh	11.00	1.05	1.95	.80	1.75	1.65*	1.65	.38	22.00
St. Louis	11.00	1.85	2.45	1.30	1.75	2.75	2.75	.24	20.00
San Francisco	10.75	1.80	2.75	1.10–2.00	1.89	3.10	3.10	.38	26.00
Seattle	10.75	.....	1.92	.....	3.10	4.50	.....	.50	27.60

*New Jersey State Hwy. Spec. 120M. †ASTM Spec. D266-31. ‡80% maximum ferric oxide. §Per 100 lb. *Per roll, 65 lb. xPer lb. *500-lb. drums.
Note: Red lead dry, same as white lead in oil, red lead in oil 50c higher.

MISCELLANEOUS ITEMS

WINDOW GLASS

Discounts from latest jobbers list, Sept. 15, 1928. Single or Double Thickness.

	A quality	B quality
Atlanta	85%	85%
Baltimore	90%	92%
Birmingham	88%	90%
Boston	88–10–5%	90–10–5%
Chicago	90%	92%
Cincinnati	87@10%	89@10%
Cleveland	89–10–10%	91–10–10%
Dallas	88%	90%
Denver	86%	88%
Detroit	87@10%	89@10%
Kansas City	89@10%	89@10%
Los Angeles	90%*	90@40%*
Minneapolis	87%	89%
Montreal	.....	.....
New Orleans	88%	90%
New York	89%	91%
Philadelphia	88@30%	90@30%
Pittsburgh	90%	90%
St. Louis	90%	92%
San Francisco	90%	90@30%
Seattle	90@10%	90@20%

*Disc. from list Aug. 1, 1929. †F.o.b. Arsenal

EXPLOSIVES

Per lb. dynamite delivered 50-lb. cases.

	Gelatin 40%	Gelatin 60%
Atlanta	$0.215	$0.2375
Baltimore	.15	.165
Birmingham	.105	.120
Boston	.1625	.1725
Chicago	.....	.....
Cincinnati	.27	.29
Cleveland	.19	.205
Dallas	.155	.175
Denver	.1525	.1675
Detroit	.237	.255
Kansas City	.15	.20
Los Angeles	.1725†	.1925†
Minneapolis	.17	.185
Montreal	.1875	.2125
New Orleans	.19	.22
New York	.22	.235
Philadelphia	.....	.....
Pittsburgh	.105	.12
St. Louis	.13	.145
San Francisco	.1575	.1775
Seattle	.1525	.1675

CHEMICALS

Water, sewage treatment, road work, f.o.b., carlots, New York:	
Bleaching powder, in drums, f.o.b. works, per 100 lb.	$1.90
Calcium chloride, 77-80%, flaked, in 400-lb. drums or 100-lb. moisture proof bags, f.o.b. works, freight equalised with points of competition, per ton	19.50
Chlorine, cylinders, per lb. delivered	.05½
Silicate of soda, 52 deg., in drums, f.o.b. works, per 100 lb	1.35
Soda ash, 58%, in paper bags, per 100 lb	1.20
Sulphate of aluminum, commercial, in 100 lb. bags per ton	27.00
Sulphate of copper, in bbl., per 100 lb.	3.85

PILES

Prices per linear foot, pine, with bark on f.o.b., New York; delivered from barge, 1½ to 2c. per ft. additional:

Dimensions	Points	Length	Short Leaf Barge	Short Leaf Rail	Long Leaf Barge	Long Leaf Rail
12 in. at butt	6 in.	30 to 50 ft.	$0.11	$0.155	$0.12	$0.154
12 in.—2 ft. from butt	6 in.	50 to 59 ft.	.15	.20	.14	.19
12 in.—2 ft. from butt	6 in.	60 to 69 ft.	.16	.215	.15	.20½
14 in.—2 ft. from butt	6 in.	50 to 69 ft.	.185	.225	.19½	.23½
14 in.—2 ft. from butt	6 in.	70 to 79 ft.	.2025	.225	.23½	.29½
14 in.—2 ft. from butt	5 in.	80 to 85 ft.	.265	.375	.....	.....
14 in.—2 ft. from butt	5 in.	85 to 89 ft.	.305	.442	.....	.....

RAILWAY TIES

Prices f.o.b., per tie, for carload lots:

		6 In. x 8 In by 8 Ft	7 In. x 9 In. by 8½ Ft.
Boston	Oak, untreated	$1.00	$1.35
	Pine, untreated	1.00	1.35
	Pine, creosoted	1.45	2.00
New York	Long-leaf sap pine, untreated	.80	1.00
	Mixed oak, untreated	.....	1.00
	White oak, untreated	.75	1.50
Birmingham	White oak, creosoted	no market	
	Southern pine, untreated *6x8x8'6"	.45*	.60
	Southern pine, creosoted	1.00*	1.20
Chicago	White oak, untreated	1.15	1.40
	Oak, empty cell, creosoted	1.50	1.88
	Oak, zinc treated	1.40	1.70
	Southern pine, creosoted	1.35	1.78
Los Angeles	Fir, untreated	.50	.72
	Fir, creosoted	1.67	2.40
Philadelphia	Red oak, untreated	1.15	1.35
	Red oak, creosoted	1.40	1.65
	White oak, untreated	.95	1.40
St. Louis	Red oak, untreated	.93	1.35
	Red oak, creosoted	1.30	1.90
	Sap Pine or cypress, untreated	.75	1.20
San Francisco	Douglas fir, green, untreated	.45	.63
	Douglas fir, empty cell, creosoted	1.14	1.56
Montreal	Birch or maple, untreated	1.10	1.10
	Birch or maple, creosoted	1.25	1.55

CURRENT PRICES OF CONSTRUCTION MATERIALS

WATER, SEWER AND DRAIN PIPE

	C. I. PIPE	VITRIFIED SEWER PIPE				CLAY DRAIN TILE		CONCRETE SEWER PIPE		WROUGHT STEEL PIPE			
	Per net ton, f.o.b. 6 in. and over*	Per foot, delivered, standard (‡ f.o.b.) 8 in., s.s.	12 in., s.s.	24 in., d.s.	36 in., d.s.	Per 1,000 ft., carload lots, f.o.b. 6 in.	8 in.	Per ft., delivered; ASTM C 14-24 12 in.	24 in.	Full standard weight. # 1 to 3 in., Black	Butt Weld Galv.	2½ to 6 in., Black	Lap Weld Galv.
Atlanta	$42.00	$0.225	$0.405	$1.4625	$3.25	$80.00	$128.00	$0.55	$1.60	44%	37%	42%	34%
Baltimore	45.50	.24	.46	2.05	6.12	102.00	157.00	.75	2.00				
Birmingham	38.00	.25	.45	1.625	4.660	85.00	.....	.45	1.60	48.939%	37.918%	50.162%†	39.143% †
Boston	45.00	.231	.4455	2.025	5.945	60.10	101.00	.49	1.85				
Chicago	46.50	.28	.54	1.98	5.60	85.00	120.00	.675	2.25	56%	45%	55%	57%
Cincinnati	45.00	.294	.432	1.89	5.74	64.29	.....	.40	1.40	57.33%	46.31%	58.55%	47.53%
Cleveland	46.50	.203	.3915	1.665	5.125	47.25	72.00	.536	2.102	58.4%	48.4%	60.6%	49.6%
Dallas	50.00	.27	.486	1.944	.....	160.00	229.00	.46	1.57	64%	55%	63%	54%
Denver	58.00	.23‡	.415‡	1.73‡	.....	.....	.....	.....	.....	56%	45%	43%‡	57%
Detroit	46.50	.28	.54	2.25	6.15	73.25	122.65	.55	1.60	54%	42.3%	52.6%	41.8%
Kansas City	48.00	.35	.55	1.90	3.80	115.00	.....	.....	.....	.....	.....	.....	.....
Los Angeles	46.50	.2825‡	.508‡	2.03‡	5.535‡	115.50	192.50	1.00	2.00	53.57%	43%	53%	42.51%
Minneapolis	48.50	.283	.51	2.04	5.13	.....	.....	.50	1.33	.....	.....	.....	.....
Montreal	.....	.....	1.10	3.70	.....	.....	.....	.....	.....	.....	.....	.....	.....
New Orleans	44.00	.275	.462	1.62	.....	50.00	.....	.45	1.67	.....	.....	.....	.....
New York	45.00	.308	.594	2.64	7.38	.....	.....	.55	2.00	51.88%‡	40.86%‡	53.10%†‡	42.08%†‡
Philadelphia	42.00	.315	.6075	2.70	.....	150.00	230.00	.....	.....	52.37%‡	41.35%‡	53.39%†‡	42.57%†‡
Pittsburgh	48.00	.217‡	.418‡	1.80‡	5.43‡	46.00	82.00	.75	1.75	64%	55%	65%†	56%†
St. Louis	45.00	.27	.486	1.944	3.96	85.00	172.00	.80	2.28	51.51%	40.49%	52.74%	41.71%
San Francisco	46.00	.265	.477	1.908	5.22	105.00	175.00	.....	2.20	52.4%	63.4%	51.1%	64.6%
Seattle	47.50	.35	.63	2.52	.....	85.00	200.00	1.50	1.60	60.3%	51.3%	65.3%	52.3%

*b. & s. class B and heavier, C/L lots. Burlington, N. J. (base) $42.00. Gas pipe and class A, $3 per ton additional, 4-in., $3 per ton additional.

#Discounts from standard list for delivery from warehouse, except Pittsburgh prices are f.o.b. mill. Base price $200 per net ton. List prices per ft.: ¼ in., 8½c; ⅜ in. 11½c.; 1 in. 17c.; 2 in., 37c.; 2½ in., 58½c.; 3 in., 76½c.; 4 in., $1.09; 6 in., $1.92.
†3½ to 6 in., ‡2½ to 3 in. ‡Resale price to consumer, car load lots shipped from mill.

LUMBER AND TIMBER

		SHORT LEAF YELLOW PINE AND DOUGLAS FIR								LONG LEAF Y. P.	
		Per M ft. b.m., carload lots f.o.b. All Fir planks No. 2 common; Fir timber is No. 1 common.				All S. L. Y. P. is No. 2 common or better and for No. 1 N. C. Box. Lengths up to 20 ft.				Per M ft. b.m., C/L lots, f.o.b., merchantable grade up to 20 ft.	
		1x6, S4S	1x8, S4S	2x4, S4S	2x6, S4S	2x8, S4S	2x10 S4S	3x12 Rgh	6x12 Rgh.	12x12, Rgh.	2x12, Rgh.	12x12, Rgh.
Atlanta	Southern Pine	$18.00	$19.00	$21.00	$18.50	$20.00	$20.50	$28.00	.....	.....	$38.50	$40.00
Baltimore	Southern Pine	25.00	26.00	31.50	29.50	30.50	33.00	38.00			54.00	55.00
	Douglas Fir	29.00	29.00	31.00	29.00	30.00	32.50	30.00	$30.00	$30.00		
Birmingham	Long Leaf	18.25	19.25	21.25	19.25	20.25	20.25	42.00			32.00	39.80
	Southern Pine	18.25	19.25	20.00	18.00	19.00	19.00	29.00	29.00	28.00	.....	.....
Boston	Southern Pine	30.50	32.00	37.75†	39.00†	55.00‡	63.00‡	73.00‡	.....	.....	73.00	73.00
	Douglas Fir	31.25	33.50	38.50	40.25	40.75	41.00	44.00	44.00	44.00	.....	.....
Chicago	Southern Pine	27.00	28.40	33.50	30.00	31.00	32.50	45.00	.....	.....	54.00	58.00
	Douglas Fir	28.50	29.50	31.75	30.50	30.50	28.50	40.75	41.75	41.75	.....	.....
Cincinnati	Southern Pine	32.00	32.00	32.00	31.50	35.00	35.00	42.00	.....	.....	46.00	.....
	Douglas Fir	.....	.....	.....	.....	.....	.....	48.00	48.00	52.00	.....	.....
Cleveland	Southern Pine	28.50	29.50	31.00	28.00	30.25	30.50	45.00	45.00	.....	46.00	57.00§
Dallas	Southern Pine	26.25	27.00	29.02	26.27	27.92	28.72	42.44			47.55	55.55
	Douglas Fir	29.45	30.53	33.28	30.55	31.64	32.45	44.85	44.85	44.85	.....	.....
Denver	Douglas Fir	.....	34.50*=	38.50*	37.50*	37.50*	42.50*	48.00*	50.00*	55.50		
Detroit	Southern Pine	26.00	27.50	30.00	27.00	30.00	32.00	37.00			32.00	43.75
	Douglas Fir	.....	.....	.....	.....	.....	.....	43.25	44.25	44.25	.....	.....
Los Angeles	Douglas Fir	27.00	28.50	28.50	25.00	25.50	25.50	35.00	38.00	34.00	.....	.....
Minneapolis	Western Pine	44.00*	41.25*	34.00*	31.50*	33.00*	31.50*	50.75*‹	.....	.....	.....	.....
	Douglas Fir	33.25*	34.50*	36.00*	33.50*	35.00*	37.00*	47.00*	50.75*	50.75*	.....	.....
Montreal	Spruce	36.00	36.00	30.00	30.00	32.00	34.50	36.00	.....	.....	.....	.....
	Douglas Fir	48.00	48.00	43.00	52.25	52.25	58.75	.....	.....	.....	.....	.....
New Orleans	Southern Pine	27.50	28.45	33.20	28.15	30.75	31.95	43.95	.....	.....	45.65	52.75
	Douglas Fir	28.95	31.50	33.90	28.75	32.65	33.95	37.95	.....	.....	.....	.....
New York	Southern Pine	32.00*	33.50*	37.50*	32.50*	35.00*	36.50*	51.00*			78.50*	77.25*
	Douglas Fir	.....	.....	41.00*	39.00*	40.00*	41.00*	39.00*	41.00*	41.00*	.....	.....
Philadelphia	Southern Pine	24.50	25.50	27.00	25.50	26.50	27.00	31.00			61.00	59.00
	Douglas Fir	.....	.....	31.00	31.00	31.00	31.00	32.50	32.50	33.50	.....	.....
Pittsburgh	Southern Pine	26.50	27.75	32.75	29.25	31.75	32.75	41.50	.....	.....	57.50	57.50
	Douglas Fir	33.50	34.50	34.50	33.50	34.00	34.25	46.25	46.25	46.25	.....	.....
St. Louis	Southern Pine	32.50*	34.00*	35.50*	32.50*	34.00*	34.00*	55.00*			56.50*	71.00*
	Douglas Fir	.....	.....	.....	.....	.....	.....	55.00*	54.50*	54.50*	.....	.....
San Francisco	Douglas Fir	15.00ℓ	16.00ℓ	17.00ℓ	14.50ℓ	15.50ℓ	16.50ℓ	21.00ℓ	21.00ℓ	21.00ℓ	.....	.....
Seattle	Douglas Fir	22.50	21.50	21.50	21.00	22.50	22.50	20.00	20.00	22.00	.....	.....

*Delivered. †Spruce. ‡Long-leafed Y. P. §Norway Pine. ‹Northern Pine. ℓDouglas fir. =Native. tAt ship's tackle.

CURRENT BUILDING AND CONSTRUCTION WAGE RATES PER HOUR

	Bricklayers	Carpenters	Structural Iron Workers	Hoisting Engineers	Plasterers	Common Labor Building	Common Labor Heavy Const.
Atlanta	$0.70/1.125	$0.40/.90	$0.60/1.25	$0.60/1.25	$0.50/.75	$0.30/.40	$0.30/.40
Baltimore	1.25	1.10	1.37½	1.25	1.25	.45	.45
Birmingham	1.00	1.00	1.00	1.00	1.00	.30	.30
Boston	.90/1.30	.70/1.17½	1.20	.90/1.17½	.90/1.62½	.40/.70	.40/.70
Cincinnati	1.27½	1.02½	1.20	1.07½	1.27½	.45	.40
Chicago	1.50	1.31¼	1.35	1.31¼	1.50	.82½	.82½
Cleveland	1.25	1.12½	1.25	1.12½	1.25	.72	.72
Dallas	1.10	1.00	1.12½	.75	1.25	.40	.40
Denver	.60/1.12½	.60/.87½	.60/.87½	.60/.87½	.....	.50	.50
Detroit	1.25	1.00	1.25	.75/.95	1.25	.50	.50
Kansas City	1.32½	1.12½	1.25	1.12½	1.12	.50/.60	.60/.75
Los Angeles	1.10	1.10	1.25	1.10	1.25	.50	.60
Minneapolis	.90/1.20	.75	.90	.75	.90	.40	.50
New Orleans	1.00	.75	1.00	1.00	1.25	30./.40	.30/.40
New York	1.50	1.40	1.45/1.65	1.50/1.56¼	1.50	.82½	.82½
Philadelphia	.75/1.20	.60/1.20	1.00/1.20	.75/1.20	.60/1.20	.30/50	.30/.50
Pittsburgh	.50/1.00	.50/1.00	.50/1.00	.50/1.00	.50/1.00	.35/.50	.35/.50
St. Louis	1.50	1.25	1.47	1.35/1.47	1.50	.78½	.35/.78½
San Francisco	1.50*	1.10	1.37½	1.12½	1.25*	.62½	.60
Seattle	1.25	1.12½	1.37½	1.25	1.50	.70	.70
Montreal	0.70	.60	.60	.55	67	.35	.25

Skilled Avg: (Bricklayers, Carp., Ironworkers) $1.1191. Common Avg. $0.5349 *6-hr. Day

CONSTRUCTION REPORTS

WATERWORKS

PROPOSED WORK

Ariz., Williams—City plans constructing dam in Dog Town Wash, pipe line from dam to distributing system, filtration plant, water main extensions. P.W.A. project. $120,000. Weilland Eng. Co., Pueblo, Colo., engrs. Noted Mar. 22.

Calif., Pittsburg—Preliminary report submitted to City Council for development of water supply for domestic and industrial use, 1,300,000 gal. reservoir, southeast of Antioch, water to be pumped from Old River 2 mi. east of Knightsen, incl. filtration plant. $975,000. C. C. Kennedy, Call Bldg., San Francisco, engr. Noted Nov. 2.

Ill., Coulterville—City plans waterworks and distribution system, incl. reservoir, one each motor-driven and gasoline-driven 400 g.p.m. pumps, distribution mains, fire hydrants, tank on tower, valves. $140,000. Application P.W.A. grant and loan of $140,000 still pending in Washington for final action. Russell & Axon, 4903 Delmar Blvd., St. Louis, Mo., engrs. Noted Sept. 21.

Ill., Highland—City making preliminary studies to increase height of impounding dam or construct new reservoir, pump house, pump pipe line, extensions, etc. Russell & Axon, 4903 Delmar Blvd., St. Louis, Mo., engrs.

Ill., Springfield—City plans 16 in. watermain in 8 city blocks Ash St. from College St. to West Grand Ave. P.W.A. project.

Ill., Springfield—City plans filter plant, incl. 3 lime slakers, 1 aluminum feeding machine, 1 activated carbon feeding machine, ammonia sulphate and liquid chlorine, feeding equipment, electric freight elevator, and 6 rate-of-flow controllers for filter plant at Lake Springfield. P.W.A. project. Burns & McDonnell, 107 West Linwood Blvd., Kansas City, Mo., engrs. Noted May 24.

Kan., Sedan—City soon takes new bids 3½ mi. 8 in. pipe and complete water filtration plant. Constructing impounding dam and lake, with K.E.R.C. labor. Est. $90,000. P.W.A. allotted $90,000 grant and loan. Black & Veatch, 700 Mutual Bldg., Kansas City, Mo., engrs.

Mich., Escanaba—City plans c.i. force main, $20,000; watermain extensions $39,000; repair of manholes for sewers $4,500. T. F. Kessler, city mgr. P.W.A. approved applications.

Mich., Port Hope—B. R. Webb, village clk., rejected bids constructing waterworks system, incl. 6,400 gal. per hr. capacity filtration plant, 9,500 ft. 2- to 6-in. c.i. water mains, valves and hydrants, 1,400 ft. 10 in. intake line, pumps, pressure tank, etc. Est. $25,000. P.W.A. project. Will readvertise. W. R. Ransom, Huron Bldg., Pontiac, engr. Noted Aug. 2.

Minn., Kinney—Village defeated $26,500, water system enlargement. A. H. Magnus, village clk.

Mo., Elsberry—City indefinitely postponed waterworks improvements. Rejected $88,000 loan and grant by P.W.A. Russell & Axon, 4903 Delmar Blvd., St. Louis, engrs. Noted Dec. 5.

Mo., Marceline—City plans constructing 3 mi. 10 in. water pipe line to Mussel Fork Creek. Black & Veatch, 700 Mutual Bldg., Kansas City, engrs.

Mo., Param—City indefinitely postponed construction waterworks ssytem. $45,000. P.W.A. loan and grant withdrawn. Russell & Axon, 4903 Delmar Blvd., St. Louis, engrs.

N. J., Bridgeton—City plans enlarging filtration plant and repairing waterworks. Remington, Vosbury & Goff, Camden, engrs. Noted Aug. 16.

N. Y., Paris—Town, F. A. Wicks, chn., plans installing 35,000 gal. water storage tank. M. Woodin, in charge.

Okla., Checotah—City plans completed and soon takes bids waterworks system improvements, incl. new lake and supply, filtration and distribution improvements. $60,000. Burns & McDonnell Eng. Co., 107 Linwood Blvd., Kansas City, Mo., engrs. Noted Sept. 7, 1933.

Okla., Nowata—Sept. 10, by City, waterworks improvements. $21,000. Black & Veatch, 700 Mutual Bldg., Kansas City, Mo., engrs.

S. D., Huron—City plans water system improvements. $90,000. Will apply for federal aid. O. A. Ricker, city engr.

Tenn., Trimble—City, soon takes bids 8 in. well, with 250 gpm. motor-driven pump, 50,000 gal. steel tank on 100 ft. tower, eight 6 in., five 4 in. and one 2 in. valves and boxes, 22 fire hydrants, 10,000 lb. c.i. specials, 85 house connections, 60 ft. 8 in., 4,970 ft. 6 in., 6,165 ft. 4 in. and 4,725 ft. 2 in. c.i. pipe laid, etc. $25,000. P.W.A. allotted $30,000. T. Allen, 65 McCall Bldg., Memphis, engr. Noted Aug. 9.

Tex., Overton—City soon takes bids improving and extending waterworks, sanitary sewerage system. $110,000. Bonds voted for same. H. L. Thackwell, Overton, engr. Noted Aug. 2.

Tex., Richland Springs — Municipality plans waterworks distribution and tank. Est. $30,000. S. J. Bross, San Saba, engr.

Tex., Thorndale—City, c/o Secretary, election Sept. 18. $19,000. waterworks. J. A. Sauls, 1229 Allston St., Houston, engr. Noted Aug. 16.

Utah, Levan—City plans replacing wooden mains with c.i. pipe, also extending distribution system. $35,000. P.W.A. loan granted. Caldwell & Richards, Templeton Bldg., Salt Lake City, engrs. Noted Oct. 12.

Bid Prices

TABULATIONS of unit prices bid on the following jobs are on record in the offices of *Engineering News-Record:*

Dam and Reservoir — Dansville, N. Y., Bids opened July 25, $61,785.50.

Calaveros Aerator—San Francisco, Bids opened July 6, $84,930.15.

Laying University Mound Pipe Line Extension — San Francisco, Calif., July 6, $71,556.70.

New Water Supply, dam, filter plant and pump station, concrete reservoir and pipe line—Cleveland, Okla., July 31, 1934, $143,918.

Copies will be furnished on request. Please state which tabulations are wanted and send one three cent stamp for each tabulation requested. Manager, Business News Department, Engineering News-Record.

Utah, Soldier Summit—City plans installing 6 mi. water supply main from spring to distribution system. $30,000. P.W.A. loan allotted. E. O. Anderson, Price, engr.

Vt., Barton—Village, c/o Village Clerk, plans improvements to waterworks system. $15,000. Engineer not appointed. P.W.A. project, funds allotted.

Va., Broadway—Town Council, J. P. Harpine, mayor, plans constructing waterworks system. $47,000 P.W.A. loan and grant approved.

Washington—R. H. Tutmark, chn. Bd., Alderwood Manor, Seattle, returned unopened bids to have been opened Aug. 25, constructing water distribution system addition in Alderwood Water Dist. between Seattle and Everett. $60,000. Bids will be taken when market is more favorable for bond sale.

Alta., Edmonton—City Council plans waterworks extensions, sewers and paving. $200,000. Plans and report will be prepared by A. W. Haddon, city engr.

Alta., Jasper—National Parks Branch preparing plans for waterworks extensions. $35,000.

Ont., Kirkland Lake—J. W. McBain, clk., making plans and soon takes bids water system, for Teck Twp. $75,000.

Ont., Niagara-on-the-Lake — Town plans installing booster pump with pipes laid to deep water to ensure more adquate water supply. $1,000. H. C. Acres, Niagara Falls, engr.

Ont., Owen Sound—City plans addition to watermains. $25,000.

Ont., Owen Sound—Town plans new filtration basin. $25,000. W. H. Waddell, City Hall, engr.

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Buildings:

Public 93
Commercial 95
Industrial 95

Federal Government projects are classified under heading denoting type of work and designated by symbol of †

◆

BIDS ASKED

Calif., Los Angeles—Oct. 3, by Metropolitan Water Dist., 306 West 3rd St., F. E. Weymouth, engr., constructing 110.62 mi. Colorado River Aqueduct, involving constructing cut-and-cover concrete conduit, concrete-lined canal, precast and monolithic concrete siphons, steel pipe siphon and appurtenant works of the Colorado River Aqueduct. Est. $35,000,000.

Ill., Forest—Sept. 17, by Village Council, waterworks project. $32,000. Warren & Van Praag, Milliken Bldg., Decatur, engrs. P.W.A. project. Noted July 26.

Ill., Heyworth—Sept. 20, by Village, Village Hall, constructing waterworks project. $68,000. P.W.A. project. Warren & Van Praag, Inc., Millikin Bldg., Decatur, engrs.

Ill., Nokomis—City bids about Jan. 1, waterworks and distribution system. $45,000 allotted by P.W.A. J. J. Woltman, Bloomington, engr.

Mass., Marlboro—See "Contracts Awarded."

Mich., Detroit—Sept. 11, by C. J. Plagens, secy., Dpt. Water Supply, 735 Randolph St., drainage pump house, gate houses, facing coagulation basins and mixing chambers, 28x30½ ft. drainage house, 30 ft. high, brick, steel, concrete construction; two 29 ft. sluice gates, 14½ ft. high coagulation basin and mixing chamber, facings of 11 ft., 508 ft., 9 ft. and 92 ft. of 3 ft. high facing, incl. parapet, repair of unloading dock and ramp 15½ ft. long, 13 ft. wide and 15 ft. high; furnishing, installing flow meters for pumps 23 to 26 inclusive at Springwells Pumping Plant, for Dpt. Water & Supply, G. H. Fenkell, gen'l. mgr., 735 Randolph St. P.W.A. project.

CONTRACTS AWARDED

Calif., San Clemente—City, constructing c.i. watermains, 41,418 ft. 4 in., 3,559 ft. 6 in., 1,600 ft. 8 in. and 560 ft. 10 in. c.i. pipe, gate valves and miscellaneous fittings, to D. Mulherron, 276 West Marquita St., $36,936. Awarded Aug. 17.

Ind., Bedford—City, filtration plant, to W. E. Mick, 1020 East Michigan Ave., Indianapolis, $64,123. Est. $73,000. P.W.A. Bids Aug. 6. Noted July 26.

Ind., North Vernon—City, improving waterworks, incl. ortholidine apparatus, chlorinating apparatus, steam heating boiler, storage tank, steel galv. pipe conduit, structural steel, brick, c.i. pipe water level gage, flow controllers, to Dunlap & Co., Columbus. $22,000. Est. $25,000. P.W.A. Bids July 20. Noted Aug. 9.

Kan., Sedan—See "Proposed Work."

Md., Grantsville—E. L. Folk, town clk., constructing waterworks system addition, to M. B. Van Dorn, Richmond, Va., $32,850. Est. $33,000. P.W.A. Noted May 17.

Mass., Boston—City, Dpt. P. Wks., C. J. Carven, comr., City Hall Annex, laying and relaying c.i. watermains in Glen Rd., Walnut Ave., Forest Hills and Sigourney Sts., Roxbury and West Roxbury, to M. F. Gaddis, 6 Beacon St., $229,565. P.W.A. Bids Aug. 16, awarded Aug. 29. Noted Aug. 9.

†*Federal Government.*

For official proposal advertising see Searchlight Section

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Waterworks (Continued)

Mass., Marlboro—City, City Engineer, City Hall, replacing and extending c.i. water pipe lines, day labor. $25,000. **Metcalf & Eddy**, 1300 Statler Bldg., Boston, engrs.

Mass., Townsend—Town, H. B. Boynton, chn. Bd. Water Comrs., Town Hall, constructing several driven wells, to E. F. Hughes, 53 State St., Boston, $8,196. Bids Aug. 13, awarded Aug. 24. **P.W.A.** Noted Aug. 9.

Mich., Wyandotte—City, furnishing, installing one 2.2 m.g.p.d. pump with motor and starter, and one 2.6 m.g.p.d. pump and 5 m.g.p.d. motor and starter, 220 volt motors and starters, to Fairbanks-Morse & Co, 900 South Wabash Ave., Chicago, Ill., $4,026***concrete found, for elevated water tank, pipe tunnel and connection to pipe gallery, to Frisch Bros. Constr. Co., Wyandotte, $2,045. Bids Aug. 20, awarded Aug. 23. Noted Aug. 9.

N. Y., Almond—Village, c.i. pipe, to Florence Pipe & Fdry. & Mchy. Co., Florence, N. J., $15,288***valves and hydrants, to W. A. Case & Son Mfg. Co., Buffalo, $1,696***miscellaneous materials, to Le Valley, McLeod & Kincaid Co., 215 East Church St., Elmira, $1,260. Grand total $18,244. **P.W.A.** Bids June 13. Noted June 7.

N. Y., Watkins Glen—Village, FERA Office, H. Babcock, purch. agt., steel tank, to Pittsburgh Des Moines Steel Co., Neville Island, Pittsburgh, Pa., $4,600; c.i. pipe, to Le Valley, McLeod & Kincaid, 215 East Church St., Elmira, $1,775; job to be built using local labor. Est. $20,000. FERA funds granted.

N. C., Raleigh—State Hy. & P. Wks., W. L. Craven, engr., drilling 2 wells 500 ft., at Central Prison, to Heater Well Drilling Co., $4,200. Bids Aug. 24.

O., Elmore—Village, 22x41 ft. stucco water softening plant building and mains, to O. R. Hartman, Elmore, $6,486; equipment, to Permutite Co., 1836 Euclid Ave., Cleveland, $8,935. **P.W.A.** Bids July 28, awarded Aug. 22. Noted Aug. 16.

Pa., Reading—City Clerk, Contr. 63, raising concrete spillway for Ontelaunee Dam, to Whiting Turner Constr. Co., Stewart Bldg., Baltimore, Md., $167,416. Bids Aug. 22, awarded Aug. 29. Noted Aug. 9.

Ont., Burlington—Burlington Water Comrs., laying 12,000 c.i. force main, to Peter Mahan, 26 Ava Rd., Toronto, $6,570***supplying main and specials, to Gartshore-Thompson Pipe & Fdry. Co. Ltd., Hamilton, $23,047. Noted Aug. 30.

Ont., Toronto—Chairman Bd. Control, constructing 69 ft. 3 in. high surge tank, 32 ft. 4 in. drain. rein.-con. with 13½ in. brick outer walls at John St. Pumping Station, to Goldie Constr. Co., Ltd., 32 Church St., $31,465*** connection to Shaft 5A, to Grant Contg. Co., Ltd., 47 Wellington St. E., $32,249. Bids Aug. 7. Noted Aug. 2.

SEWERAGE AND WASTE DISPOSAL

PROPOSED WORK

Calif., Huntington Beach—City, making plans sewage disposal plant. $100,000. Construction under P.W.A. loan and grant of $100,000. City council plans bond election to secure loan of $70,000. H. Overmeyer, city engr. O. A. Stone, 888 El Campo Dr., San Marino, consult. engr. Noted Feb. 22.

Calif., Oxnard—City plans construction primary clarifier, digester, pumping station, trickling filter, secondary filter, sludge pump, drying beds, screens and appurtenances. $72,000. P.W.A. project. E. O. Imus, City Hall, engr.

Calif., San Francisco—J. S. Dunnigan, clk. Bd. Supervs., City Hall, did not receive bids Aug. 20, for disposal of garbage and refuse of City and San Francisco Co. for period of 25 years. No bids having been received, the city will continue the "fill and cover" method for approximately 2 years more. Noted June 14.

Idaho, Boise—City plans constructing storm sewer and extending sanitary sewers. $35,000. P.W.A. loan granted. C. C. Stevenson, city engr. Noted Aug. 2.

Ill., Camp Villa Maria—City plans sewage treatment plant. Wells Eng. Co., Geneva, engrs.

Ill., Macomb—City making final plans filter spray type of sewage disposal plant, complete with auxiliary piping, sewer connections, etc. $89,000 grant and loan allotted by P.W.A. Kinsey Eng. Co., 515 Court St., Pekin, engrs. Noted Oct. 12.

Ill., Streator—City soon takes bids sewerage system in various streets. $825,000 grant and loan allotted by P.W.A. F. Renz, city engr. Noted Jan. 18.

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Ill., Wood River—City plans trunk and relief sewers in various streets, pumping, equipped with motor driven or diesel pumps. $110,800 grant allotted by P.W.A. $415,000-$425,000. Sheppard, Morgan & Schwaab, Alton and Edwardsville, engrs.

Ind., Batesville—Municipality making plans sewage plant. $46,000. P.W.A. project. C. Brossman, 1009 Chamber of Commerce, Indianapolis, engr. Noted Feb. 22.

Ind., Goshen—City soon takes bids erecting sewage treatment plant and interceptor sewer. $455,000. P.W.A. project. Bemis & Co., 105 West Adams St., Chicago, Ill., engrs. R. Wheeler, city engr. Noted June 28.

Ind., Kendallville—City making plans sewage disposal plant. $71,500. P.W.A. project. C. Hurd, 1039 Architects Bldg., Indianapolis, engr.

Ind., North Vernon—City, W. H. Stemm, mayor, revising plans sewage disposal plant. $43,000. Former bids rejected. C. Hurd, 1039 Architects Bldg., Indianapolis, engr. P.W.A. project. Noted July 5.

Bid Prices

TABULATIONS of unit prices bid on the following jobs are on record in the offices of *Engineering News-Record*:

Sewers — Minneapolis-Saint Paul Sanitary District, Bids received June 18, 19, 1934. Jobs 300, 330 and 120.

Sewage Treatment Plant—Geneva, N. Y., Bids received June 7, 1934. Low $143,429.

Levee Earthwork — Atchafalaya Front Levee District, U. S. Engineers, Bids April 27, 1934.

Sewer—San Francisco, Calif., Bids opened July 18, $245,543.

Copies will be furnished on request. Please state which tabulations are wanted and send one three cent stamp for each tabulation requested. Manager, Business News Department, Engineering News-Record.

Ia., Clarion—City bids in September or October, constructing sewage treatment plant, incl. 250 cu.yd. concrete, 6,000 sq.ft. tile wall, 7,000 ft. lumber, 12 windows, screens, 4 doors, 2,000 cu.yd. excav., 2,400 underdrains, 1,200 ft. 6 in. v.s. pipe, filter mechanism, 1,340 cu.yd. rock, 26,000 lb. structural steel, 60 squares roofing, 550 ft. 6 in. c.i. pipe, 200 ft. miscellaneous v.s. pipe, primary tank mechanism, sludge pump and heating, sewage pump. $28,600. $10,000 P.W.A. grant accepted. Buell & Winter Eng. Co., Sioux City, engrs. Noted Aug. 2.

Md., Cumberland—City soon takes bids sewer interceptors. Gannett, Seelye & Fleming, 600 North 2nd St., Harrisburg, Pa., engrs. P.W.A. project.

Mich., Escanaba—See "Waterworks."

Mich., Escanaba—City, T. F. Kessler, mgr., plans storm sewers. $45,000, and repairing water filtration plant, $7,000. P.W.A. allotments approved.

Mich., Gladstone—City plans sewerage system. $90,000 P.W.A. allotment. Shoecraft, Drury & McNamee, Ann Arbor, engrs. Noted Oct. 26.

Mich., Grand Rapids—Beverley Hills Twp. plans sewer and water system. $34,000 P.W.A. allotment. G. J. Wagner, Grand Rapids, engr. Noted Sept. 14.

Mich., Owosso—City, election Sept. 11, to vote bond issue sewage disposal plant, rein.-con. treatment works with outfall sewer and necessary appurtenances. $131,000. P.W.A. loan and grant approved. Pate, Hamann & Hirn, 1610 Washington Blvd., Detroit, engrs. Noted Aug. 30.

Mich., Rochester—City plans sewage disposal plant, $76,000 P.W.A. allotment. Greeley & Hansen, 6 North Michigan Ave., Chicago, Ills., engrs. Noted Sept. 7.

Mo., Malden—City election at early date, $30,000, sanitary sewerage system, incl. sewage plant, trunk sewer, lateral connections, $126,776. Applied for $102,000 loan and $24,766 grant under P.W.A. Russell & Axon, 4903 Delmar Blvd., St. Louis, engrs. Noted Dec. 21.

N. Y., Honeoye Falls—Village voted to construct sewage disposal system. $175,000. W. S. Lozier, Inc., 10 Gibbs St., Rochester, engr.

N. Y., Long Island City — See "Contracts Awarded."

N. D., Oakes—City plans sewage disposal plant. To exceed $25,000 (not official). City Engineer directed to draw plans and take steps to get government aid. H. E. Dady, city auditor.

O., Ashville—Village voted bonds, 18,600 ft. 8- to 12-in. vitr. clay sewers. $40,000. Burgess & Nipple, 568 East Broad St., Columbus, engrs. Noted Jan. 25.

O., Middletown—City, C. E. Sebald, in charge, plans extending Bull Run Storm Sewer, concrete pre-cast or monolithic pipe, $295,000 (with FERA). Bond issue of $150,000 for city's share to be voted Nov. 7. Engineer not appointed.

Okla., Clinton—City plans sewage disposal plant. $41,000. P.W.A. loan and grant approved. C. P. Smith, Clinton, engr. Noted Dec. 5, 1933.

Pa., Erie—City plans 9 in. sanitary sewerage system in southwestern section of city, $30,000 to $35,000. C. K. Pulling, Dep. City Engr., City Hall.

Pa., Oil City—Cranberry Twp. plans new sanitary sewerage system in Sage Run Rd. from Oil City, 6,100 ft. city line. $25,000. B. Weber, city engr. Project will be financed by Township, but work will be done under supervision of city engineer of Oil City.

Tenn., Jackson—City Comm., election Oct. 4, $30,000, for new city incinerator.

Tex., Bastrop—City will not construct sanitary sewers. Project abandoned. P.W.A. allotment rescinded. Noted Feb. 1.

Tex., Overton—See "Waterworks."

Tex., San Antonio—Bexar Co. Water Contl. & Imprvt. Dist., c/o P. H. Mullinax, pres., 601 Pleasanton Rd., plans sanitary sewers. P.W.A. approved $154,000 allotment. H. R. F. Heller, Frost Bldg., consult. engr.

Utah, Kaysville—City plans sewerage system, $55,000. P.W.A. loan granted. Caldwell & Richards, Templeton Bldg., Salt Lake City, engrs. Noted Feb. 22.

Utah, Ogden—City plans 5,000 ft. 6 and 8 in. sanitary sewer in 11½ blocks District 157. $27,795. C. L. Corey, city engr.

†Va., Fort Myers—Con. Q.M., rejected bids Aug. 11, storm water sewer and subsoil drain for field officers-quarters. Will readvertise.

Alta., Edmonton—See "Waterworks."

Ont., London—City plans sewers in north end of city as unemployment relief. $72,150. W. M. Veitch, City Hall, engr.

BIDS ASKED

Ill., Edwardsville—City bids delayed until about Sept. 20, constructing sewage treatment plant, incl. auxiliary piping, $75,000; intercepting sewers and appurtenances, incl. 6- to 27-in. vitr. clay or concrete pipe, and 10- to 24-in. c.i. pipe, etc., $105,000. Action pending passage of bond ordinance. $199,000 loan and grant accepted from P.W.A. W. H. Morgan, city engr. Sheppard, Morgan & Schwaab, Alton and Edwardsville, engrs. Noted July 19.

Ill., Kenilworth—City bids about Nov. 23, storm sewerage system in various streets. $340,000 allotted by P.W.A. Windes & Marsh, Winnetka, engrs.

Ia., Forest City—Sept. 12, by W. C. Haugland, city clk., City Hall, 1,880 ft. 12-in. v.s. and 4,100 ft. 6 and 8 in. c.i. sewers, 2,000 cu.yd. filter rock, 400 cu.yd. concrete, and sewage plant, etc. $140,000. Voted $28,000 bonds. $40,000 grant and loan allotted by P.W.A. Noted Aug. 2.

Md., Hurlock—Sept. 11, by Town, 4 mi. 8 to 12-in. terra cotta sewers, manholes, etc. P.W.A. project. J. Spence Howard, 20 East Lexington St., Baltimore, engr. Noted Jan. 11.

Minn., St. Paul—Sept. 10 (extended date), by Minneapolis-St. Paul Sanitary Dist., 1923 University Ave., constructing Contr. 105, Div. D, Job 400, $400,000. C. C. Wilbur, c/o owner, ch. engr. Noted Aug. 23.

N. J., Clifton—Sept. 12, by Bd. Freeholders-Passaic Co., Court House, Paterson, storm drains, G. Hewitt, Court House, Paterson, co. engr.

W. Va., Kermit—See "Waterworks."

CONTRACTS AWARDED

Mass., Boston—City, Dpt. P. Wks., C. J. Carven, comr., City Hall Annex, concrete sewer lines in Hyde Park Ave., Hyde Park and West Roxbury, to Callia & Zarella, Inc., 197 Salem St., $24,387. **P.W.A.** Bids Aug. 15, awarded Aug. 23.

Mass., Boston—City, Dpt. P. Wks., C. J. Carven, comr., City Hall Annex, constructing sewage lines in Shepard Brook in Everett St., Brighton, to V. J. Grande Co., 100 Academy Hill Rd., Brighton, $40,059. **P.W.A.** Bids Aug. 14, awarded Aug. 29. Noted Aug. 9.

Mass., Newton—Turner Constr. Co., general contractors, 137 Newbury St., Boston, heating for incinerator building, to **T. J. Murphy & Co.**

†Federal Government

sewerage, etc. (Continued)

s Walden St., Cambridge***plumbing, to Wm. N. McKenna Co., 79 Chestnut St., Boston***electrical work, to Hawes Electric Co., 15 Main St., Watertown, for City, P. Buildings Comm., City Hall. Awarded about Aug. 23. Noted July 19, under "Contracts Awarded."

N. Y., Brooklyn—R. V. Ingersoll, pres. Brooklyn Boro, Boro Hall, to Sunset Constr. Co., 516 80th St., Brooklyn, sewers in Avenue W $19,047 ***to P. Tomasetti Contg. Co., 1074 60th St., East 2nd St., $13,112***to Delhan Constr. Co., 1325 64th St., Delamare Pla. $4,814; Mansfield Pl. $5,092; Mansfield Pl. between Aves. U and V $6,547; East 26th St., $4,638***to R. Nazzarro, Inc., 7101 11th Ave., East 4th St. $5,649; Elmore Pl. $5,247***to S. Dela Salla, 11-45 59th St., East 3rd St. $5,137***to J. DeGregory, 53 Dry Harbor Rd., Glendale, 86th St. $84,773. Grand total $150,056. Bids July 18. Noted July 12.

N. Y., Brooklyn—R. V. Ingersoll, pres. Brooklyn Boro, Boro Hall, to Sunset Constr. Corp., 516 80th St., sewers in East 18th St. $33,167; East 91st St. $8,916; Stryker St. $19,155***to Manmill Constr. Co., 1780 Pitkin Ave., East 1st St. $4,528***to A. Capasso, 36 Ashford Pl., Bedford Ave. $4,501***to Rutson Constr. Co., 1262 Sterling Pl., East 51st St. $1,843***to R. Nazzarro, Inc., 7101 11th Ave., East 45th St. $1,874; East 1st St. $5,275. Grand total $79,250. Bids Aug. 8.

N. Y., Brooklyn—R. V. Ingersoll, pres. Brooklyn Boro, Boro Hall, to E. Melluccio, 1209 61st St., sewers in West St., $5,139; East 89th St. $2,139; Avenue J $2,058; Avenue O $475; East 57th St. $2,653; Gravesend Neck Rd. $1,756 ***to S. Della Salla, 11-45 59th St., in Kings Hy. $5,209. Grand total $19,429. Bids Aug. 15. Noted Aug. 9.

N. Y., Long Island City—G. U. Harvey, pres. Queens Boro, Queens Subway Bldg., to Palmo Constr. Co., 105-12 101st Ave., Ozone Park, sewers in 69th St., $768; Penelope Ave. $1,179; 104th Ave. $1,384***to Oakhill Contg. Co., 40-05 30th Ave., pumping station at 180th St. $79,105***to Di Salvo Contg. Co., 2441 Butler St., East Elmhurst, sewers in Woodside Ave. $4,339***to C. Soviero & Son, 157 Ashford St., Brooklyn, 119th Rd., $965; Hollis Ave. $3,842; 147th St. $1,781***to Clemente & Pinepuk, 115-3 158th St., Jamaica, 156th St. $966***to Yellowstone Constr. Co., 6854 Orville St., Forest Hills, Jamaica Ave. $3,058***to Flushing Contg. & Eng. Co., 66 Wyoming Ave., Forest Hills, North Conduit Ave. $114,658. Grand total $212,045. Rejected bids July 30 sewers in 224th St. and Genesee Ave. Noted July 26.

N. Y., Long Island City—G. U. Harvey, pres. Queens Boro, Queens Subway Bldg., sewers in 88th Rd. and Nassau Blvd., to Pan Constr. Co., 244 Jackson Ave., $1,945 and $32,103 respectively***140th St., to Clemente Soviero Son, 157 Ashford St., Brooklyn, $1,512***147th St., to **Marmoth Constr. Co.**, 94-14 108th Ave., Ozone Park, $1,704; in 177th St. to Belfatto Constr. Co., 147-42 109th St., Jamaica, $2,372 ***in Hempstead Ave., to Di Salvo Contg. Co., 2441 Butler St., East Elmhurst, $12,666*** Meyer Ave. to Vicot Cemente, 115-28 131st St., Ozone Park, $764. Grand tofal $53,066. Bids Aug. 13. Rejected bids sewer in 199th St. Noted Aug. 9.

O., Columbus—W. J. Lucks, dir. Serv., constructing relief sewers in West Mound and adjoining streets. Sewer Contr. 9, involving 5,750 ft. 36- to 78-in. rein.-con. pipe, 470 ft. 10 in. vitr. clay pipe, 6,900 ft. 8 in. vitr. pipe subdrains, 33,000 cu.yd. excav., to Fornaro Co., 418 Schofield Bldg., Cleveland, $121,809. **P.W.A.** Bids **Aug. 9.**

O., Columbus—W. J. Lucks, dir. Service, garbage incinerator on Short Ave., near Scioto River, to Decarie Incinerator Corp., 155 East 44th St., New York, $118,830. Bids Aug. 7. **P.W.A.** Noted **Aug. 2.**

O., Glendale—E. R. Moser, village clk., vitr. sewer and appurtenances in Willow Ave., et al streets, to Crumley, Jones & Crumley, 311 Temple Bar Bldg., Cincinnati, $35,426***extending and improving sewage treatment plant, to H. and F. H. Hosea, Inc., 622 Bway., Cincinnati, $19,074. Bids Aug. 8. P.W.A. project. Noted Aug. 2.

Tex., Dallas—City, c/o E. Goforth, secy., furnishing, installing 81 ft. 5 in. head centrifugal non-clogging sewerage pump, 40 ft. head centrifugal sump pump with electric motor, 1 gas engine for driving sewerage pump, depth gage in place, flow meter, self cleaning sewerage screen in Cadiz St. Sewage Pumping Station, to A. M. Lockett & Co., Magnolia Bldg., $26,994. **P.W.A.** Bids Aug. 8. Noted July 26.

Tex., Dayton—City, c/o J. T. Tadlock, mayor, complete sanitary sewerage system, to Tellepsen Constr. Co., 3900 Clay St., Houston, $36,402. Subject to **P.W.A.** Noted July 26.

†*Federal Government.*

BRIDGES AND GRADE CROSSINGS

PROPOSED WORK

California—Kings Co. (Hanford) and Fresno Co. (Fresno) making plan reconstructing 510 ft. timber bridge over Kings River, between Kings and Fresno Counties. $20,000 or more. R. May, Hanford, surveyor, former and C. Jensen, Fresno, surveyor, latter counties.

Calif., Sacramento—Sacramento Co. plans constructing Ferguson-Wilder Bridge, $15,500; Lower Stockton Rd. trestle, $19,140; Fair Oaks Trestle, $13,000; M. Street bridge, $75,000; Natomas Trestle, $13,300; Rio Linda Rd. Bridges, $15,100. County will have $510,000 available for bridge and road work shortly. J. J. Rooney, Courthouse, co. engr.

Conn., Bridgeport—City making preliminary sketches and estimates 80 ft. span concrete, steel bridge, Island Brook Ave. $25,000. C. L. Nord, State Hy. Dpt., engr.

Conn., Fairfield—Town, Bd. Selectmen, plans concrete, steel bridge over Mill River at Bronson Ave.; rein.-con. bridge over Mill River at Sturges St., both bridges include new approaches; also road work on Reef Rd. $100,000. Federal grant of $36,000 allotted. Town will negotiate $64,000 bond issue.

Florida—U. S. Engineers have granted permission for constructing steel truss swing draw bridge with treated timber trestle approaches across St. Johns River 16 mi. south of Sanford on state hy. between Sanford and Titusville. State Hy. Engineers, Jacksonville, in charge.

Ill., Wheaton—City indefinitely delayed construction of overhead rein.-con. viaduct, at Naperville Ave. and Scott St., pending signing of contract covering P.W.A. grant and loan of $115,000. P.W.A. funds allotted city. G. I. McKenzie, city engr. R. Salisbury, Wheaton, archt. **Noted Feb. 1.**

N. J., Newton — Bd. Freeholders Sussex Co. constructing 5 bridges. To exceed $20,000.

N. J., Picton—Lehigh Valley R.R. Co., G. T. Hand, ch. engr., 143 Liberty St., New York, soon takes bids general contract eliminating grade crossing. $24,000 grant allotted by P.W.A. Utility Comn. approved plans and specifications.

N. J., South Plainfield—Lehigh Valley R.R. Co., G. T. Hand, ch. engr., 143 Liberty St., New York, soon takes bids general contract eliminating grade crossing. $24,600 grant allotted by P.W.A. Utility Comn. approved plans and specifications.

N. Y., Bridgehampton—Long Island R.R. Co., A. C. Watson, ch. engr., Penn. Sta., New York, plans change in structure over Butler Lane. To exceed $22,000.

N. Y., Buffalo — Delaware, Lackawanna & Erie R.R., G. J. Ray, ch. engr., Hoboken, N. J., and Erie R.R. Co., G. S. Fanning, ch. engr., Midland Bldg., Cleveland, O., plan eliminating East Amherst Street Crossing. $200,000. Noted Nov. 30.

N. Y., Homer and Truxton—Lehigh Valley R.R. Co., G. T. Hand, ch. engr., 143 Liberty St., New York, plans eliminating Town Line or Youngs Crossings, $64,000. Cost to be borne by Cortland Co., city and railroad.

N. Y., Lynbrook—New York State Pub. Serv. Comn. has ordered Long Island R.R. Co., A. C. Watson, ch. engr., Pennsylvania Sta., New York, to prepare plans and carry out elimination of grade crossing at Rocklyn Ave. $170,000. Noted June 28.

N. Y., Mount Vernon—New York, New Haven & Hartford R.R. Co., E. E. Oviatt, ch. engr., New Haven, Conn., constructing Gramatan Avenue Crossing. Pub. Serv. Comn. has deferred project until August, 1936. To exceed $40,000. Noted Nov. 5, 1931.

N. Y., Portland—Pennsylvania R.R. Co., T. J. Skillman, ch. engr., Broad St. Sta., Phila., Pa., soon takes bids changing existing structure over Westfield-Brockton Hy. $25,400. Noted Apr. 21, 1932.

Ohio—State Hy. Dpt., Columbus, plans two 200 ft. bridges with four 50 ft. spans, timber type with steel stringers over Salt Creek, one bridge near Haynes and other at South Bloomingville, Hocking Co.

South Carolina and Georgia—State Hy. Dpt., South Carolina, Columbia, and State Hy. Dpt., Atlanta, Georgia, making plans 2 steel, concrete bridges, one near Burtons Ferry over Savannah River, between Allendale, S. C., and Sylvania, Ga., and other between McCormick, S. C., and Lincolnton, Ga. $450,000. C. H. Moorefield, State Hy. Dpt., Columbia, S. C., engr.

Vermont—State Hy. Dpt., H. E. Sargent, ch. engr., Montpelier, plans gravel mixed in place to eliminate 2 railroad crossings, U. S. Route 7, Dorset, Bennington Co. $57,300. Federal allotment $57,300.

BIDS ASKED

Iowa—Sept. 12, by State Hy. Comn., Ames, bridges, culverts in Cass, Fayette, Johnson, Marshall, Mitchell and Ringgold Counties. F. R. White, Ames, state hy. engr.

Mass., Worcester—Sept. 11, by Dpt. P. Wks., F. E. Lyman, comr., 100 Nashua St., Boston, 96 ft. clear span through steel plate girder bridge with rein.-con. abutments with 581 ft. bituminous concrete and 607 ft. bituminous macadam approaches. To exceed $75,000. P.W.A. project. Noted Dec. 2.

Neb., Lincoln—Sept. 13, by Trustees Sanitary Dist. 1, three 100 ft. pony truss span bridge and concrete floor on North 27th St. $24,000. W. Scott, Lincoln, engr.

Pennsylvania—Sept. 14 at office S.S. Lewis, secy. Hys., Harrisburg, 2 span rein.-con. arch, stone faced bridge, R 201, Upper Merion and Schuylkill Twps., Montgomery and Chester Counties involving 1,800 cu.yd. Class 2 excav.; rein.-con. paving 2,450 ft. R-719, Sect. I, Appl. 10, Lower Merion, Haverford and Upper Darby Twps., city of Phila., Delaware, Montgomery and Philadelphia Counties, 8,585 cu.yd. Class 1, 2,835 cu.yd. Class 2 and 22,208 cu.yd. borrow excav.

Texas—Sept. 10, by G. Gilchrist, state hy. engr., Austin, underpass and bridges in Tarrant, Wichita, Cherokee, Nacogdoches and San Saba Counties.

†**Virginia**—Sept. 10, by Pub. Rds., Winder Bldg., 17th and F Sts., Wash., D. C., constructing 3 bridge projects in Fredericksburg-Spotsylvania County Battlefields, Memorial Park, 2 bridges near Chancellorsville, incl. 3,040 cu.yd. excav.; and other bridge over Wilderness Run, 1,000 cu.yd. excav. H. J. Spellman, principal hy. engr.

Virginia—Sept. 13, by State Hy. Dpt., Richmond, 150 ft. bridge over Rockfish River, Route C-722, Nelson and Albermarle Counties, incl. 130 cu.yd. excav.

CONTRACTS AWARDED

California—State Hy. Comn., Los Angeles, four 45 ft. rein.-con. slab span bridge on rein.-con. piles and abutment with wing walls over Escondido Creek, San Diego Co., to Perish Bros., Hollywood, $30,953. Bids Aug. 16. Noted Aug. 2.

Indiana—State Hy. Dpt., Indianapolis, constructing White Water River Bridge, Fayette Co., to I. E. Smith, Richmond, $116,998. Est. $160,121. Bids Aug. 7.

Indiana—State Hy. Comn., Indianapolis, bridges in Lake and Dearborn Counties, to S. S. Palma, Lafayette, $18,185 and $13,247 respectively, est. $24,552 and $15,122 respectively ***Crawford Co., to Vincennes Bridge Co., Vincennes, $6,769 est. $7,950***Spencer and Scott Counties, to A. G. Ryan & Sons, Chrisney, $5,460 and $7,409 respectively, est. $5,758 and $8,154 respectively. Grand total $51,070. Bids Aug. 28. Noted Aug. 23.

Mass., Lawrence—Comrs. Essex Co., Court House, Salem, piers and abutments only for Falls Bridge over Merrimack River, to Central Constr. Co., 316 Essex St., $9,600. Bids Aug. 21, awarded Aug. 24. Noted Aug. 16.

Michigan—State Hy. Dpt. Lansing, 48 ft. span, steel deck girder bridge, having 2 rein.-con. semi-gravity type abutments, N.R.M. Bl of 83-9-1, Contr. 1, Wexford Co., to C. A. Handeyside Constr. Co., General Motors Bldg., Detroit, $23,539; widening present 39 ft. span bridge to provide 42 ft. roadway and one walkway, N.R.H.-B1 of 58-12-3 Contr. 3, Monroe Co., to W. H. Knapp Co., Monroe, $4,754. **P.W.A.** Bids Aug. 17.

Mo., Hannibal—City, substructure rein.-con., steel bridge over Mississippi River, to Union Bridge & Constr. Co., 215 Pershing Rd., Kansas City, $228,438; superstructure, to Mount Vernon Bridge Co., Mount Vernon, O., $362,836. **P.W.A.** Bids Aug. 22.

New York — A. W. Brandt, comr. Hys., Albany, bridges in Nassau Co., to J. Salustri Co., Yonkers, $7,200 est. $9,118***Essex Co., to C. L. Smith, Inc., 406 Lexington Ave., New York, $83,544 est. $93,497***Delaware Co., to O'Day & Ambrose, Binghamton, $33,159 est. $39,513***Cortland Co., to H. M. Strong & Son, Whitney Point, $7,266 est. $8,149*** Franklin Co., to Lord-Humphrey Co., Inc., Maline, $32,681 est. $37,927***Cortland Co., to E. Smith Eng. & Constr. Co., Syracuse, $12,269 est. $13,467***Chantauqua Co., to W. J. Enauer, Sherman, $8,947 est. $10,245*** Schoharie Co., to M. R. Ingraham, Inc., Albany, $144,834 est. $168,976***Livingston Co., to D. W. Winkleman & Co., Interlaken, $103,175 est. $147,350***St. Lawrence Co., to Soellman-Oliver Co., Chateaugay, $18,471 est. $22,276 ***Otsego Co., to J. A. Spooner, Albany, $10,718

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Bridges, etc. (Continued)

est. $12,459***Steuben Co., to H. W. Patterson, Ellicott Sq., Buffalo, $30,578 est. $35,640*** Otsego Co., to F. A. Ray, Herkimer, $21,530 est. $25,182***Otsego Co., to N. D. Peters & Co., Inc., Foster Bldg., Utica, $6,770 est. $7,626 ***Monroe Co., to R. E. Tompkins, Rochester, $46,557 est. $52,114***Niagara Co., to Leydecker Bros., Inc., Williamsburg, $3,954 est. $4,736***Chemung Co., to Stento & Sarafini Constr. Co., Binghamton, $31,003 est. $34,243. Grand total $608,391. Bids June 15, Aug. 10, 17 and 24.

N. Y., Buffalo—Erie R.R. Co., G. S. Fanning, ch. engr., Midland Bldg., Cleveland, O., and Lehigh Valley R.R. Co., G. T. Hand, ch. engr., 143 Liberty St., New York, eliminating grade crossings, to Metzger Constr. Co., 429 Carlton St., Buffalo, or c/o Erie R.R. Co., $33,160. Noted June 8.

N. Y., Chazy—American Pipe & Constr. Co., general contractors, Box 508, Amsterdam, 500 tons structural steel for grade crossing elimination, to American Bridge Co., Frick Bldg., Pittsburgh, Pa., for Delaware & Hudson R.R. Co., J. MacMartin, ch. engr., Albany. Noted Aug. 30, under "Contracts Awarded."

N. Y., Clifton Park—Boston & Maine R.R. Co., W. J. Backes, ch. engr., Boston Mass., and Delaware & Hudson R.R. Co., J. MacMartin, ch. engr., Albany, eliminating grade crossings, to Collins Bros., c/o Delaware & Hudson R.R., Albany, $36,761.

North Carolina—State Hy. & P. Wks., Raleigh, underpass and approaches at Hickory, Project 6221, Catawba Co., to L. S. Bradshaw, Salisbury, $30,607. Bids Aug. 7. Noted Aug. 2.

Ohio—O. W. Merrell, dir. Hys., Columbus, constructing two 64 ft. and one 80 ft. span concrete bridge with steel beams over Raccoon Creek, and grading, traffic bound surface course paving 0.206 mi. hy., on Sect. "F-2" and "G" Gallipolis-Ironton Rd., Gallia Co., to Kent Bros. Co., 180 North High St., Columbus, $32,934. Bids Aug. 24. Noted Aug. 16.

Rhode Island—State, Bd. P. Roads, State Office Bldg., Providence, Esmond and Georgiaville State Bridge 159, rein.-con. single span, T-beam, 60 ft. long, 54 ft. wide, Smithfield, to H. M. Soule, 110 Brook St., Pawtucket, $38,570. Bids Aug. 15. Noted Aug. 21 Daily.

Washington—See "Streets and Roads."

STREETS AND ROADS

BIDS ASKED

†Colorado—Sept. 12, by Pub. Rds., Denver, grading 5.879 mi. Project FHG 26-F-1, G of South St. Vrain Forest Hy. Route, Roosevelt Natl. Forest, Larimer Co. J. A. Elliott, Custom House, Denver, Colo., engr.

†D. C., Wash.—Treas. Dpt. at office Sup. Archt., Wash., D. C., rejected bids July 25, planting in triangle area. Noted July 5.

†Georgia—Sept. 19, by Pub. Rds., New Post Office Bldg., Georgia Ave., Chattanooga, Tenn., constructing 2.73 mi. Alexander Bridge Rd., Chickamauga-Chattanooga Natl. Military Park, Project 5A1, Walker and Catoosa Counties, incl. 31,000 cu.yd. excav. H. J. Spellman, principal hy. engr.

Idaho—Sept. 14, by G. E. McKelvey, comr. P. Wks., Boise, graveling 11.797 mi. Emmett-New Plymouth Hy., Gem and Payette Counties.

Ill., Madison—Sept. 10, by Dpt. P. Wks. & Buildings, Div. Hys., furnishing, applying 65,730 gal. E-3 road oil on various streets. G. H. Baker, engr. co. roads and city streets.

Iowa—Sept. 12, by State Hy. Comn., Ames, paving roads in Jefferson, Mitchell and Polk Counties; grading in Cass, Fayette, Marshall and Ringgold Counties; graveling in Adams, Bremer, Fayette, Cass, Decatur, Delaware, Des Moines, Dubuque, Henry, Jones, Lee, Madison, Pottawattamie and Union Counties; maintenance resurfacing in Appanoose, Henry, Keokuk, Lucas, Mahaska, Washington, Wayne, Jefferson, Benton, Delaware, Clayton, Johnson, Cedar and Jackson Counties. F. R. White, Ames, state hy. engr.

Kentucky—Sept. 21, by State Hy. Comn., Frankfort, grading, draining, 2.1 mi. Pineville-Manchester Rd., Bell Co.; 7.2 mi. London-Barbourville Rd., State Project 144, Laurel Co.; 4.019 mi. Nortonville-Greenville Rd., Flood Relief 24 AG, Hopkins Co.; low type surfacing 8.1 mi. Peonia-Munfordville Rd., Grayson Co.; 7.336 mi. Falls of Rough-McDaniels Rd., Grayson-Breckinridge Counties; high type surfacing 4.9 mi. Corbin-Cumberland Falls Rd., State Project 22; 8.349 mi. Williamsburg-Cumberland Falls Rd., State Project 712 AS, both Whitley Co.

Minnesota—Sept. 14, by State Hy. Dpt., St. Paul, bituminous surfacing 11.9 mi. State Project 8-46-21, NRH and M 95A and B; 8.6 mi. S.P. 43-34-21 1A and B NRH and M 436B1 and B2, and S.P. 43-43-21-2A, NRH 436A; 10.1 mi. S.P. 43-43-21-2B NRH 436A and S.P. 43-43-21-3, NRH and M 436C1 and C2; 10.2 mi. 59-59-27-2 NRH 443B1; crushed stone surfacing 4.4 mi. S.P. 44-44-21-1A and NRH and M 147B1 and B2 and S.P. 44-44-21-1B, NRH 147A.

New Mexico—Sept. 14, by State Hy. Comn., Santa Fe, grading, drainage structures, surfacing roads in Curry, Tucumcari, Bernalillo and Valencia Counties; penetration asphalt paving in Union, Dona Ana, San Juan, Socorro, Harding and Colfax Counties; grading, curbing, guttering, concrete paving in Bernalillo and Albuquerque Counties; bridge in Sandoval Co. $845,053. G. D. Macy, state hy. engr.

N. Y., New York—Sept. 12, by S. Levy, pres. Manhattan Boro. Municipal Bldg., granite block repaving Franklin St. and asphalt block repaving East 100th St.

Pennsylvania—Sept. 14, at office S. S. Lewis, secy. Hys., Harrisburg, rein.-con. paving 6,059 ft. hy. and 1 rein.-con. structure on R-43043, County-aid Appl. 9477, Stoneboro Borough, Mercer Co.

†Pa., Middletown—Sept. 12, by Con. Q.M., Middletown Air Depot, paved aprons, roads and drainage at engineers' shops area.

Texas—Sept. 10, by G. Gilchrist, state hy. engr., Austin, improving hys. in Nacogdoches, Houston, Bexar, Kendall, Travis, Comal, Lynn, San Saba, Wichita, Williamson and Tarrant Counties.

†Utah—Sept. 17, by Bureau Reclamation, Ogden, constructing relocated Huntsville Hy., at Pine View Reservoir, Ogden River Project, incl. 213,000 cu.yd. excav. E. Mead, comr.

†Utah, Ogden—Sept. 17, by Bureau Reclamation, Ogden, constructing relocated Huntsville Highway at Pine View Reservoir, Ogden River Project, near here.

†Wyoming—Sept. 12 by Pub. Rds., Denver, Colo., seal coat on 22.986 mi. road in Project FHEC1-A-2 to F-2 of Cody Yellowstone Forest Hy., Shoshone Natl. Forest, Park Co. J. A. Elliott, Custom House, Denver, Colo., dist. engr.

†Wyoming—Sept. 14, by Pub. Rds., Denver, Colo., grading 2.436 mi. and resurfacing 7.242 mi. Project NR 2-B-4 CO2, Wind River Forest Highway Route, Washakie Natl. Forest, Fremont Co. and 14.85 mi. Project FHEC 12-A-3 E-3, H-2 Centennial Saratoga Forest Hy., Albany Co. J. A. Elliott, dist. engr.

CONTRACTS AWARDED

Connecticut—J. A. Macdonald, state hy. engr., Hartford, to Innis Bros., Clay St., Thomaston, waterbound macadam paving 1.630 ft. Elm St., and rolled bank run gravel paving 8,657 ft. River Rd., Simsbury, $12,700; 20 ft. span, concrete slab bridge and loose gravel approaches on Nonewaug Rd., and loose gravel surfacing 4,800 ft. Wood Creek Rd., Bethlehem, $13,678; rolled bank run gravel on 7,975 ft. Iron Works Hill, Smith and Stony Hill Rds., Brookfield, $14,689 ***to John DiMichele & Bros., 58 High St., Torrington, turfing 5,200 sq.yd. slopes on Warren Rd., Route 45, opposite Lake Waramaug, Washington, $3,120***to Altieri Constr. Co., 192 Grand St., Waterbury, concrete flares at intersection of Highland Ave. and Route 14, Waterbury, $1,038***to Mariani Constr. Co., 59 Center St., New Haven, twin 24 ft. span concrete slab bridge over Weekeepeemee River and waterbound macadam approaches, Woodbury, $10,333***to Clark-Barone Co., 595 Legion Ave., New Haven, trap rock waterbound macadam paving 2,904 ft. Peck Rd., Bethany, $8,767*** to Alexander Jarvis, 416 Center St., Manchester, 7,050 ft. rolled bank run gravel on Birch Mountain Rd., Bolton, $10,259***to Fred D. Miller, R.F.D. No. 6, Norwich, 5,820 ft. Pond Rd. and loose gravel paving 2,940 ft. Blue Hill Rd., Franklin, $12,252; rolled bank run gravel surfacing 7,649 ft. Line Store and Chestnut Hill Rds., Killingly, $13,640***to D. Deering Co., 209 Main St., Norwalk, bituminous macadam on broken stone paving 2,185 ft. Railroad and East Aves., New Canaan, $12,725; 3 in. screened gravel on 6 in. base paving 8,782 ft. Weston-Lyons Plain Rd., Weston, $24,265***to B. N. Beard Co., Shelton, loose gravel surfacing 14,555 ft. Carrion and Kenney Hollow Rds., Southbury, $4,370***to New Haven Road Constr. Co., Inc., 1817 Dixwell Ave., Hamden, New Haven, paving road in Union, $13,657***to S-K Constr. Co., Lebanon, drainage improvement on U. S. Route 3 near Fort Hill, Groton, $988***to Oneglia & Gervasini, Casson Ave., Torrington, 50 ft. skew span, concrete T-beam bridge and 1,450 ft. waterbound macadam approaches over Still River, Route 20, Winchester, $32,113*** to N. Benvenuti, Inc., 16 Elm St., New London, rolled bank run gravel paving 12,305 ft., 4 section road, Ashford, $19,831***to Adams-Ruxton Constr. Co., 1387 Main St., Springfield, Mass., underpass on Route 20, Stafford, $11,972. Grand total $220,397. Bids Aug. 13, awarded Aug. 17-24. Noted Aug. 9.

†D. C., Wash.—Yards & Docks, Navy Dpt., Wash., D. C., roads at Naval Observatory, to Wilmot Paving Co., South Capitol and Q Sts., $1,690. Bids Aug. 29. Noted Aug. 27 Daily.

Indiana—State Hy. Dpt., Indianapolis, structure construction on road in Whitley and Noble Counties, to Tri-Lake Constr. Co., Col... City, $20,565. Est. $21,660. Bids Aug...

Indiana — State Hy. Comn., Indian... bitum. mulch liquid asphalt surfacing ... mi. road in Steuben Co., to Brook Constr. Co., Fort Wayne, $15,113. Bids Aug. 21.

Ia., Sioux City—Woodbury Co., W. H. Th... son, aud., graveling 12.3 mi. and maint... graveling 73.9 mi. roads, to Moville Constr. ... Moville, $13,883 and $14,229 respectively. ... Aug. 22. Noted Aug. 17 Daily.

Kentucky—State Hy. Comn., Frankfort, ... nishing, delivering, planting, for beautifi... of roadside 3.458 mi. N.R.H. 300-A-P, 51 ... Henderson Co., to B. J. Nickles & Sons, F... fort, $2,064***substructure and approaches ... bridge over Licking River, N.R.M. 320 ... Kenton and Campbell Counties, to Temple E... dation Co., Cincinnati, O., $210,038*** ... superstructure for same bridge, to R. C. M... Co., 8650 Mt. Elliott Ave., Detroit, M... $77,742***bit. surface type paving, except ... and gutters on 0.974 mi. hy. N.R.M. 125 ... Ohio Co., to Corum Bros., Madisonville, $10... ***planting for roadside beautification on ... mi. Shelbyville-Louisville Rd., N.R.H. 117 ... Shelby Co., to Duntreath Gardens, Lexin... $427***constructing walls, grading, etc., ... roadside beautification on Bedford-Milton ... N.R.H. 145 B-G, Trimble Co., to J. G. E... kamp, Covington, $2,491***planting, etc., ... roadside beautification on Henderson-Dixon ... N.R.H. 34 C-P, Webster Co., to Louisville ... series, Inc., St. Matthews, $121. Grand ... $303,106. Bids Aug. 24. **P.W.A.**

Kentucky—State Hy. Comn., Frankfort, ... ing, draining 4.908 mi. Sullivan-Boxville ... S.P. 710 AG, Union Co., to Corum Bros., M... sonville, $26,950. **P.W.A.** Bids July 12. N... June 28.

Md., Baltimore—Bd. Awards, Bureau H... Municipal Bldg., sheet asphalt paving 13 ... sq.yd. Contr. 647, to Baltimore Asphalt Block & Tile Co., 1330 North Monroe St., $66,852. ... Aug. 15. Noted Aug. 9.

Md., Baltimore—Bd. Awards, vitr. brick ... ing with cement filler 8,700 sq.yd. streets ... Contr. 646, to Arundel Constr. Co., 910 Tri... St., $42,940. Bids Aug. 8. Noted Aug. 1...

Massachusetts—J. E. Demers, chn, Bd. Sel... men, Southbridge, at Dpt. P. Wks., 100 Nash... St., Boston, 7,100 ft. stone and tar mixed ... place retread surfacing hy. in Southbridge, ... G. Bonozzol & Sons, Hudson, $25,374***L. F... Nourse, chn. Bd. Selectmen, Bridgewater, ... office Dpt. P. Wks., bituminous macadam pav... 2,350 ft. hy. Bridgewater to M. F. Roach & Sons, Inc., 55 Spring St., East Bridgewater, $21,938. Bids Aug. 21, awarded Aug. 23.

Massachusetts—Commonwealth of Massachusetts, Dpt. P. Wks., F. E. Lyman, comr., 100 Nashua St., Boston, bituminous macadam resurfacing and widening 18,775 ft. N.R.A. Project P.W.A. Docket 5450, R-22, Blanford and Russell to Arborio Road Constr. Co., Wilson, Conn., $93,584. **P.W.A.** Bids Aug. 14, awarded Aug. 29.

Mississippi—E. D. Kenna, dir. State Hy. Comn., Jackson, grading, drainage structures, bridging 12.174 mi. Quitman-Enterprise Hy. N.R.S. 258, Clarke Co., to Cobb Bros. Constr. Co., Citizens Natl. Bldg., Meridian, $74,983. Est. $61,000. **P.W.A.** Bids Aug. 23.

N. J., New Brunswick—East Brunswick Twp., Milltown, rein.-con. paving 1.17 mi. Milltown Boro Rd., to Utility Contr. Co., New Brunswick, $32,873. Bids Aug. 1.

New York—A. W. Brandt, comr. Hys., Albany, grading, structures 0.95 mi. Nassau Co., to J. F. Crandell Corp., 220 East 42nd St., New York, $104,447 est. $118,623***4.53 mi. Suffolk Co., to Mill Basin Asphalt Corp., B4616 Glenwood Rd., Brooklyn, $420,909 est. $474,348***reconstructing 1.37 mi. Orleans and Monroe Counties to Canty, O'Neill & Candell, Inc., Buffalo, $38,767 est. $45,005***graveling 0.84 mi. Tompkins Co., to Arnani & Gessler, Syracuse, $19,948 est. $26,913***concrete paving 0.33 mi. Livingston Co., to Potter-DeWitt Corp., Pavilion, $43,732 est. $55,672***5.18 mi. Tompkins Co., to Bero Eng. & Constr. Corp., North Tonawanda, $201,898 est. $245,018***road in Queens Co., to Tully & Di Napoli, Inc., 30-11 12th St., Long Island City, $213,213 est. $252,181***3.26 mi. Monroe Co., to Manitou Constr. Co., 183 Main St. E., Rochester, $74,598 est. $80,293***grading, structures 0.01 mi. Queens Co., to Wilson & English Constr. Co., 50 Church St., New York, $161,999 est. $207,577***concrete paving 0.74 mi. Steuben Co. and 4.12 mi. Allegany Co., to H. E. Bunce, Hornell, $65,566 and $174,283 respectively est. $75,326 and $212,220 respectively***6.43 mi. Genesee and Livingston Counties, to Whitmore, Rauber & Vincinius, Inc., 51 Griffith St., Rochester, $261,826 est. $314,622 ***2.93 mi. Wyoming Co., to Cold Spring Constr. Co., Inc., Akron, $127,762 est. $130,617. Grand total $1,908,939. Bids June 15, Aug. 10, 17 and 24. Noted Aug. 9 and 16.

N. Y., Brooklyn—R. V. Ingersoll, pres. Brooklyn Boro, Boro Hall, to G. Alfieri, 188 Ainslie St., regulating sidewalks on Albemarle Rd., $375***to Borough Constr. Co., 139-32 231st St., Laurelton, Flatlands Ave. $1,450***to Maguire Dugan Constr. Co., 3416 Avenue H...

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†Federal Government

Streets and Roads (Continued)

Lenox Rd., $1,077*to B. Turecamo Contg. Co., **New Cropsey Lane**, asphalt paving Albany Ave., $5,615; Clermont Ave., $38,183***to Cranford Co., 52 9th St., resurfacing Heater Atkin Ave. $33,481***to Carbloc Paving Co., Varick Ave. and Stagg St., Blake Ave. $20,911; Lafayette Ave. $7,038; Meserole St. $21,035*** to Mill Basin Asphalt Co., 4616 Glenwood Rd., Hopkinson Ave. $9,333***to Brooklyn Alcatraz Asphalt Co., 407 Hamilton Ave., 86th St., $29,300***to M. J. O'Hara Contg. Co., Neptune Ave. and West 19th St., 5th Ave., $21,849. Grand total $189,647. Bids Aug. 15. Noted Aug. 9.

N., Y., Brooklyn—R. V. Ingersoll, pres., Brooklyn Boro, Boro Hall, to Walthaw Corp., 1860 Bway., **New York**, granite block paving Leonard St. $36,394***to B. Turecamo Contg. Co., 1573 63rd St., Thatford Ave. $8,834; Avenue U $31,937; Van Buren St. $34,720; asphalt block paving 13th St. $55,479***to Meehan Paving & Constr. Co., 90 West St., **New York**, granite block paving Hicks St. $17,243; Summit St. $15,008; 5th Ave. $22,958***to Brooklyn Alcatraz Asphalt Co., 407 Hamilton Ave., Berry St., $14,119; Caton Ave. $15,386. Grand total $282,114. Bids Aug. 1. Noted July 26.

N. Y., Long Island City—G. U. Harvey, pres., Queens Boro, Queens Subway Bldg., to Highway Impvt. & Repair Co., Furmans Island, Brooklyn, asphalt paving 37th St. $18,450; 36th Ave. $11,205; 27th St. $4,074; Strongs Causeway $30,993; 42nd St. $8,309; 187th Pl. $19,288; 47th Ave. $11,007; 33rd St. $7,153; Ditmars Blvd. $7,003***to W. P. McDonald Constr. Co., 7 Lawrence St., Flushing, 41st St. $3,544; College Pl. $31,535; 23rd Ave. $3,828***to Pomonok Asphalt Paving & Material Co., 1217 Grand St., Brooklyn, Dutchkill St. $7,300; 54th Ave. $6,291; 23rd St. $7,911; North Hempstead Turnpike $32,656***to Carbloc Paving Co., Varick Ave. and Stagg St., Old South Rd., $17,007. Grand total $227,754. Bids Aug. 6.

N. Y., Long Island City—G. U. Harvey, pres., Queens Boro, Queens Subway Bldg., to Salomone, Inc., 2231 Seymour Ave., New York, regulating 183rd St. $1,698; Elkhorne St. $1,817; 109th Ave. $1,345***to Mascioli & Son, 20th Ave., $1,034; 125th St. $2,915***to Cavanagh Constr. Co., 27 South 22nd St., Flushing, 39th Ave. $4,066***to Zummo Constr. Co., 92-12 212th St., Bellaire, 99th St. $4,020***to Pomonok Asphalt Paving & Building Material Co., 1217 Grand Ave., Brooklyn, asphalt paving 50th St. $8,267; 49th St. $5,872; 20th Rd. $2,249; 63rd St. $3,580***to Highway Impvt. & Repair Co., Furmans Island, Brooklyn, granite paving Stanhope St. $18,070; Bway. $50,637; 126th St. $19,719; 75th St. $13,661; Park Lane South $11,475***to W. P. McDonald, 7 Lawrence St., Flushing, 162nd St. $9,884. Grand total $159,809. Bids July 23. Noted July 19.

Ohio—O. W. Merrell, dir. Hys., Columbus, grading, removing old pavement, and concrete paving 0.191 mi. Sect. "A" (part) Lima-Sandusky Rd., Erie Co., to Thompson Paving & Constr. Co., 4232 North Haven Ave., Toledo, $7,478***concrete paving 0.136 mi. Sect. "E" (part) Medina-Norwalk Rd., Lorain Co., to A. J. Baltes, 181 Benedict Ave., Norwalk, $8,197***removing old waterbound macadam pavement and paving with rein.-con. 0.303 mi. Sect. "U" (part) Cleveland-East Liverpool Rd., Portage Co., to General Asphalt Paving Co., 307 Kahler Bldg., Canton, $11,194. Grand total $26,969. Bids Aug. 24. Noted Aug. 16.

Ohio—O. W. Merrell, dir. Hys., Columbus, brick paving, incl. furnishing, delivering brick 1.42 mi. Sect. "A" U. S. Route 250, Wayne Co., to **Garaux Bros.**, 415 9th St. S.W., Canton, $66,730; concrete paving 0.755 mi. hy., and constructing 55 ft. span concrete beam bridge, 40 ft. roadway, and two 3 ft. sidewalks over Timber Run, Sect. "I" National Rd., Muskingum Co., to N. Cenci, 1381 Essex Ave., Columbus, $95,768. Bids Aug. 17. Noted Aug. 9.

Pennsylvania—At office S. S. Lewis, secy. Hys., Harrisburg, dual type paving consisting of 2 outer lanes of rein.-con., and center lane of bituminous surface, 12.834 ft. R-153, Sect. 10, Sellersville Boro, Hilltown and West Rockhill twps., involving 26,427 cu.yd. Class 1, 858 cu.yd. Class 2 and 3,153 cu.yd. borrow excav., Bucks Co., to Acchione Constr. Co., 1607-09 McKean St., Phila., $139,510***bituminous surface course Spec. E on either native or modified broken stone base course paving 11.247 ft. R-854, Sect. R-2, Cambria and Munster Twps., 133,444 cu.yd. Class 1, 729 cu.yd. Class 2 and 876 cu.yd. borrow excav., Cambria Co., to York Eng. & Constr. Co., 1000 North Hartley St., York, $148,423***grading, rein.-con. paving 14,285 ft. R-29 and 307, Potter Twp., 41,158 cu.yd. Class 1, 309 cu.yd. Class 2 and 6,376 cu.yd. borrow excav., Centre Co., to N. W. Quigley, Mifflin, $129,407***2 span through plate girder bridge, R-57, Rush and Decatur Twps., 4,336 cu.yd. Class 1, 654 cu.yd. Class 2 and 6,959 cu.yd. borrow excav., Centre and Clearfield Counties, to B. B. Constr. Co., Philipsburg, $61,065***rein.-con. paving 7,055 ft. hy. and rein.-con. bridge on R-92, Washington Twp., 7,058 cu.yd. Class 1, 458 cu.yd. Class 2 and 129 cu.yd. borrow excav., Clarion Co., to Holmes Constr. Co., Wooster, O., $57,822***rein.-con. paving, incl. 2 rein.-con. arches, and grading in connection with same, 13,473 ft. R-169, Sect. 5, Bear Creek and Buck Twps., 12,136 cu.yd. Class 1, 2,494 cu.yd. Class 2 and 1,644 cu.yd. borrow excav., Luzerne Co., to B. G. Coon Constr. Co., 278 Union St., Luzerne, $108,145***rein.-con. paving 22,771 ft. R-101, Sect. 1-A, Keating and Liberty Twps., 4,643 cu.yd. Class 1 excav., McKean Co., to Tri State Eng. Co., Waynesburg, $134,185***bituminous penetration surface course on native stone or modified broken stone base paving, 9,469 ft. hy. constructing rein.-con. bridge, grading in connection with same, R-236, Sect. 2, Eulalia and Hebron Twp., 11,177 cu.yd. Class 1, 335 cu.yd. Class 2 and 58 cu.yd. borrow excav., Potter Co., to A. Menzies, 175 Parkwood Ave., Kenmore, $48,703. Grand total $827,260. Bids Aug. 17. Noted Aug. 9.

Pennsylvania—At office S. S. Lewis, secy. Hys., Harrisburg, rein.-con. paving 2.25 mi. hy. also 2 rein.-con. structures on Routes 67 and 301, Sects. R-1 and R-2, A. and B. Indiana Boro, White Twp., Indiana Co., to M. Bennett Sons, 404-408 Saving & Trust Bldg., Indiana, $108,981. Bids Aug. 10. Noted Aug. 2.

Pennsylvania—At office S. S. Lewis, secy. Hys., Harrisburg, rein.-con. and bit. Spec. "E" and wearing surface on existing bridge 0.56 mi. Route 160, Sect. 5, Ontelaunee Twp., Berks Co., to H. Denburger Cont. Co., Inc., Bethlehem, $46,172. Bids Aug. 10. Noted Aug. 2.

Pennsylvania—At office S. S. Lewis, secy. Hys., Harrisburg, rein.-con. and bit. surface on broken stone base paving 0.2 mi. Route 163, Sect. 1, Lower Towamensing Twp., Carbon Co., to H. J. Williams Co., Inc., Summer St., and W. M. R. R., York, $31,605***rein.-con. paving 0.85 mi. Rural Route 25029 Mill Creek Twp., Erie Co., to Chas. H. Fry, 1902 Cherry St., Erie, $33,023***rein.-con. paving 1.33 mi. Route 200, Sect. 1, Spring Creek Twp., Warren Co., to Baldwin Bros. Paving Co., Union Trust Bldg., Cleveland, O., $52,020. Grand total $413,848. Bids Aug. 17. Noted Aug. 9.

Tenn., Nashville—City, removing old wooden block pavement, and resurfacing with black base and asphaltic wearing surface on existing and new (if necessary) concrete found., incl. curbing, guttering 9 sections of downtown streets, to Eller & Olsen, Cotton States Bldg., $51,793 (tentative award). Subject to P.W.A. approval.

Utah—State Rd. Comn., Salt Lake City, oil processing roadbed 13.32 mi. Emery Co., to W. W. Clyde & Co., Springville, $42,764 est. $39,726***15.825 mi. road in Davis, Box Elder, and Cache Counties, to O. Nelson, Logan, $52,310 est. $46,000***constructing 300 ft. span rein.-con. rigid frame bridge and approaches on 0.056 mi. road in Sevier Co., to J. W. Whiting, Springville, $8,606 est. $9,100***grading, graveling roadbed 5.322 mi. road in Weber Co., to A. O. Thorn, Springville, $49,184 est. $46,482. Grand total $152,864. **P.W.A.** Bids Aug. 22. Noted Aug. 16.

Utah—State Rd. Comn., Salt Lake City, fine aggregate surfacing 15.404 mi. road in Garfield Co., to Reynolds Ely Co., Springville, and O. Nelson, Logan, $124,467 est. $110,382*** widening shoulders on 5.517 mi. road in Davis Co., to Gibbons & Reed, 165 East 4th St., Salt Lake City, $5,945 est. $7,587. **P.W.A.** Bids Aug. 23.

Utah—State Rd. Comn., Salt Lake City, plant mix fine aggregate surfacing 11.095 mi. road in Carbon and Wasatch Counties, and oil processing roadway by road mix method 8.615 mi. road in Kane Co., to W. W. Clyde & Co., Springville, $78,584 and $30,218 respectively est. $94,243 and $28,740 respectively. **P.W.A.** Bids Aug. 20.

Washington—State Hy. Comn., Olympia, bank protection 0.1 mi. road in Whatcom Co., to Everett Bros., concrete, $3,661***0.2 mi. in King Co., to F. and M. Butorac, 308 4th Ave. S., Seattle, $7,923***2 trestles in Pacific Co., to D. Nygren, 309 Lloyd Bldg., Seattle, $44,833. Grand total $56,425. **P.W.A.** Bids Aug. 21. Noted Aug. 9.

Wash., Seattle—Bd. P. Wks., paving East John St., to Queen City Constr. Co., 603 18th Ave. S., $28,577. Awarded subject to approval of City Council as low bid exceeded engineer's estimate made 3 years ago. Bids Aug. 24. T. R. Beeman, County City Bldg., engr.

Wyoming—State Hy. Dpt., Cheyenne, oil treating by road mix method 13.454 mi. road in Fremont Co., to Richard Spatz, Cheyenne, $48,171. **P.W.A.** Bids Aug. 24.

B. C., West Vancouver—British Pacific Properties Ltd., Royal Bank Bldg., Vancouver, graveling 10 mi. streets, to General Constr. Co. Ltd., Granville Island, Vancouver, $15,000; grading 4¼ mi. hy., to W. C. Arnett & Co., 986 East Hastings St., Vancouver, $25,000.

†*Federal Government.*

EARTHWORK, IRRIGATION DRAINAGE AND WATERWAYS

PROPOSED WORK

Calif., Martinez—Election Sept. 25, $35,000 for yacht harbor. City plans to secure loan of $35,000 from P.W.A. and $15,000 grant. Noted Aug. 16.

Calif., Stockton—City, Port Comn., making surveys yacht harbor. $25,000 or more.

Ga., Atlanta—Comrs. Fulton Co. Court House, plan 13.5 mi. drainage ditches. $105,000 P.W.A. allotment granted. County Engineer, c/o Court House, engr.

Me., South Portland—Cumberland County Power & Light Co., 443 Congress St., Portland, plans dredging 25,000 cu.yd. basin at end of present wharf to 25 ft. below mean low water, constructing 2 wood pile dolphins near end of present wharf. To exceed $25,000.

Mass., New Bedford — City, P. Wks. Dpt., City Hall, plans furnishing rip rap and driving sheet pile bulkhead in harbor. $53,300. P.W.A. Project, funds allotted. G. H. Nye, city engr.

Mich., Detour—Village, T. Bateske, pres., making preliminary estimates and application to be filed with P.W.A. for financing breakwater in St. Marys River from Detour to Frying Pan Island, involving depositing approximately 75,000 cu.yd. rock material in 30 ft. of water. $30,000.

N. J., Bradley Beach—Bradley Beach Comrs. plan steel rock jetty for protection of beach front. $50,000. Will ask aid from Commerce & Navigation Dist.

N. Y., Hempstead — Hempstead Town Bd. plans improving local waterways. $60,000 bonds issued.

†**Ore., Astoria**—Yards & Docks, Navy Dpt. Wash., D. C., rejected bids Aug. 22, repairing bulkhead and piers at Naval Submarine and Destroyer Base. Will readvertise.

†**Wyoming**—Bureau Reclamation, Dpt. Interior, Casper, withdrew bids to have been opened Aug. 27, constructing canal, Sta. 190 to 1,164, for Casper Canal, Casper Alcova Project. Will readvertise. Noted Aug. 9.

BIDS ASKED

Calif., Los Angeles—See "Waterworks."

Ill., Hillview—Hartwell Drainage & Levee Dist., c/o Secretary, bids about Nov. 22, constructing pump house and euipment in back of Hartwell Drainage & Levee Dist. $83,000. P.W.A. project. Caldwell Eng. Co., Jacksonville, engrs.

†**Louisiana**—Sept. 14, by U. S. Eng., P. O. Box 667, Vicksburg, Miss., constructing 36,300 cu.yd. earthwork on east bank Ouachita River. $14,520.

†**Mich., Detroit**—Sept. 14, by U. S. Eng., dredging 979,547 cu.yd. from St. Clair River.

†**Mississippi**—Sept. 14, by U. S. Eng., P. O. Box 667, Vicksburg, constructing 139,000 cu.yd. earthwork on left bank Red River Dist. 1, in Arkansas, $20,850; and 40,000 cu.yd. earthwork on south bank Arkansas River in Arkansas, $19,126.

†**Montana**—Sept. 24, by U. S. Eng., Kansas City, Mo., constructing spillway at Fort Peck Dam.

Nebraska—Sept. 12, by Bd. Trustees Platte Valley Public Power & Irrigation Dist., North Platte, constructing diversion dam and intake of Sutherland Project, in Keith Co. Parsons, Klapp, Brinckerhoff & Douglas, 142 Maiden Lane, New York, consult. engrs.

†**New Jersey**—Sept. 12, by U. S. Eng., Phila., Pa., dredging 33,000 cu.yd. material from Woodbury Creek.

†**O., Cleveland**—Sept. 19, by U. S. Eng., Buffalo, N. Y., removing 150 lin.ft. west breakwater and light foundation and constructing 400 ft. spur breakwater at Cleveland Harbor.

CONTRACTS AWARDED

†**Maryland**—U. S. Eng., 323 Post Office Bldg., Baltimore, dredging 250,000 cu.yd. in Knapp Narrows, to S. B. Brooks Corp., South and Water Sts., Baltimore, $34,611. Bids Aug. 24. Noted Aug. 16.

†**Md., Ocean City**—U. S. Eng., 2,380 ft. stone jetty at entrance to Ocean City Inlet, to J. A. Howland & Sons, Sea Bright, N. J., $176,985. Bids Aug. 10.

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Earthwork, etc. (Continued)

Massachusetts—Commonwealth of Massachusetts, F. E. Lyman, comr., 100 Nashua St., Boston, furnishing, placing 4,250 tons stone rip rap and 7,200 cu.yd. backfill to protect bank, Manomet Point, Plymouth, to **M. J. Crowley**, 61 Pershing Rd., Jamaica Plain, $9,598***, extending 2 stone and repairing 5 stone jetties, 1,650 tons stone rip rap at West Chop, Tisbury, to Merritt, Chapman & Scott Corp., 292 Pequot Ave., New London, Conn., $8,019***grading, 4,000 sq.yd. bank, furnishing, placing 1,000 cu.yd. coarse gravel, and 4,400 tons stone rip rap at Singing Beach, Manchester, to Thos. Mackey & Sons, 468 Lafayette St., Salem, $9,840. Grand total $27,457. Bids Aug. 21, awarded Aug. 23 and 29.

†**Missouri and Nebraska**—U. S. Eng., Kansas City, Mo., crib dikes and revetment in Missouri River at White Cloud and Tarkio Bends, to Bilhorn, Bowers & Peters, Railway Exch. Bldg., St. Louis, Mo., $588,522.

†**Missouri**—U. S. Eng., St. Louis, to Badgett Constr. Co., Memphis, Tenn., 3,000 ft. standard revetment in Mississippi River at Hurricane Field-Boston Bar, $68,160***to **W. P. McGeorge**, Pine Bluff, Ark., 3,000 ft. standard timber piling and 1,000 ft. revetment in Mississippi River at Giboney Island-Cape Girardeau, $95,745; 1,500 ft. timber piling and 1,700 ft. revetment in Missouri River at Howard Bend-St. Albans, $65,565***to Woods Bros. Constr. Co., 132 South 13th St., Lincoln, Neb., 6,000 ft. solid dikes in Mississippi River at Maple Island, $341,305; 3,000 ft. revetment at Dogtooth Bend, $86,475; 2,400 ft. timber piling dikes in Missouri River at Bonhomme Island, $56,390; 2,600 ft. standard piling dikes and 2,500 ft. revetment in Missouri River, at Pelican Bend-Mullanphy Island, $107,320***to Morrison-Glasscock-Connor Co., 1822 Main St., Kansas City, 4,000 ft. revetment, Giboney Island-Devils Island, $96,820; 2,000 ft. timber piling dikes and 2,000 ft. revetment in Mississippi River, Willard-Grand Tower Island, $104,713 ***to Massman Constr. Co., New York Life Bldg., Kansas City, 1,200 ft. timber piling dikes, 1,800 ft. crib dikes, and 1,200 ft. revetment in Missouri River at Marthasville Reach-New Haven, $93,710; 1,600 ft. timber piling dikes and 2,400 ft. revetment in Missouri River at Washington, $81,045***5,200 lin.ft. timber piling dikes in Missouri River at Bates Island-Berger Bottoms, $113,245. Grand total $1,310,493. Bids Aug. 16 and 18.

Missouri—U. S. Eng., Kansas City, to Massman Constr. Co., 737 New York Life Bldg., Kansas City, 4,570 ft. pile dikes at Providence Bend to Eureka Bend, $130,582; 2,870 ft. pile dikes at Cote Sands-Dresden Reach and Isbell Reach $84,591; 6,745 ft. pile dikes at DeWitt Bend to Glasgow Bend, $205,672***to Woods Bros. Constr. Co., Lincoln, Neb., 3,000 ft. pile dikes at Rushville and McQueens Bends, $85,631; 1,100 ft. dikes and 1,570 ft. revetment at Liberty Bend to Lexington Reach $66,492***to J. Spiteaufsky, 2452 Benton Blvd., Kansas City, 2,350 lin.ft. pile dikes at Weston Bend $65,595 ***to Bilhorn, Bower & Peters, 1811 Railway Exch. Bldg., St. Louis, 5,460 ft. pile dikes and 2,100 ft. revetment at Rocheport Reach to Lupus Reach $190,033. Grand total $828,596. Bids Aug. 23.

Washington—See "Streets and Roads."

UNCLASSIFIED

PROPOSED WORK

Colo., Colorado Springs—GAS LINE—City Council, E. Mosley, mgr., plans extending gas distributing system to Broadmoor and North and South Cheyenne canon districts. Will probably ask for bids on materials in a few weeks. P.W.A. allotted $30,000. Noted Dec. 21.

Connecticut — BROADCASTING STATION — American & Republican, Inc., 174 Grand St., Waterbury, making plans broadcasting station, incl. two 190 ft. steel towers and building in Prospect, Studio Waterbury. Private plans.

Kan., Oswego—SWIMMING POOL—**City, E. S.** Nance, clk., voted $15,000 bonds for 60x120 ft. rein.-con. swimming pool. Est. $30,000-$32,000. May do work by force account, using FERA labor for most work.

N. Y., Brooklyn — SWIMMING POOL — Dpt. Parks, Arsenal Bldg., Central Park, New York, plans by A. Embury, c/o owner, swimming pool at Dyker Beach Park, 86th St. and 14th Ave. Est. about $40,000.

N. Y., Jamaica—STABLES—J. Miehl, 30-28 89th St., plans by A. Millenhassen, c/o owner, 1 story stables, Black Stump and Fresh Meadow Rds. Est. $28,000 with equipment.

N. Y., Jamestown—ATHLETIC FIELD—Bd. Educ., 4th and Spring Sts., plans modern athletic field, rear of Washington Junior High School, $25,000 or more. L. F. Graham, city engr.

N. Y., New York—COMFORT STATION—Dpt. Parks, Arsenal Bldg., Central Park, plans by A. Embury, c/o owner, comfort station, Zoological Park. $38,000.

N. Y., New York—COMFORT STATIONS—

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Dpt. Parks, Arsenal Bldg., Central Park, New York, soon takes bids comfort stations at Highbridge Park and 164th St. and at 358 Cherry St. To exceed $28,000. A. Embury, c/o owner, archt. Noted Aug. 23.

N. Y., New York—SWIMMING POOL—Dpt. Parks, Arsenal Bldg., Central Park, plans by A. Embury, c/o owner, swimming pool, St. Ann's Ave. and 149th St. Est. about $40,000.

N. Y., Ridgewood—COKE SILO—P. Dietz Coal Co., 61-20 71st Ave., Ridgewood, plans 2 story, steel, concrete, coke silo and yard addition, 71st Ave. and Cypress Hills St. Est. about $22,000.

N. Y., Woodhaven—SWIMMING POOL—Dpt. Parks, Arsenal Bldg., Central Park, New York, plans by A. Embury, c/o owner, swimming pool at Forest Park, Woodhaven Blvd. and Myrtle Ave. Est. about $40,000. **Maturity later.**

Pa., Pittsburgh — AMPHITHEATRE — Pittsburgh Civic Light Opera Assn., Mrs. Frank W. Weberman, chn., 3520 Northumberland Ave., plans by C. M. Stotz, Bessmer Bldg., 8,000 seating capacity outdoor amphitheatre, incl. 3,000 car capacity parking space. To seek federal loan.

S. C., Charleston—DOCK and TERMINAL—Standard Oil Co. of New Jersey, 26 Bway., New York, plans dock and terminal to replace shipyard Creek dock. $75,000.

Tex., Beaumont—RACE TRACK—Gates Park, Inc., c/o O. E. Hause, Beaumont, plans constructing race track, incl. 1 mi. track, grandstand 6,400 seating capacity, 18 stables, paddocks, offices and other buildings. $400,000.

W. Va., Grafton—RAILROAD—Baltimore & Ohio R.R. Co., H. A. Lane, ch. engr., Baltimore, Md., preliminary plans nearing completion for relocation of about 15 mi. trackage north of here, due to construction by U. S. Govt. of a flood control dam on Tygarts River. Final plans underway. Will design new system of trackage at this point. **Maturity in spring 1935.** Noted Apr. 26.

Alta., Edmonton—COAL PROPERTIES DEVELOPMENT—Alberta Carbon Coal Co., c/o H. Cameron, Edmonton, or c/o S. J. Bartlett, 1500 Walnut St., Phila., Pa., plans development of coal properties near here. To exceed $150,000 with equipment.

Man., Headingly—BROADCASTING STATION —W. J. Major, minister of Telephones of Manitoba, announces plans underway constructing 15,000 watt radio broadcasting stations. $100,000.

N. B., Fredericton — ELECTRIC POWER EXTENSIONS — New Brunswick Electric Power Comn., making plans extensions in Northumberland Co. $451,650.

Ontario—GOLD MINING PROPERTY DEVELOPMENT—Canadian Gold & Metals Mining Co., 330 Bay St., Toronto, plans developing gold mining properties, various locations. To exceed $100,000.

Ont., London — RAILROAD STATION — Canadian Natl. Ry., C. Z. Gzowski, ch. engr., Montreal, Que., plans by H. C. Schofield, railroad archt., new station. $250,000.

Ont., Sambra—GAS and OIL DEVELOPMENT —Anglo-Natural Gas & Oil Syndicate, plans development. Est. about $50,000.

Ont., Windsor—PETROLEUM DEVELOPMENT—Guardian Petroleum Development Co. Ltd., J. Bolema, pres., Muskegon, Mich., plans development. $100,000.

Que., Three Rivers—WHARF REPAIRS, etc. —Canadian International Paper Co. plans repairing old wharves and building new sheds. $400,000.

†**Canal Zone**—FUEL SYSTEM—Con. Q.M., France Field, rejected bids Aug. 20, gas fuel system at France Field.

BIDS ASKED

La., Shreveport—FIRE ALARM SYSTEM—See "Contracts Awarded."

Minnesota—GAS PIPE LINE—See "Contracts Awarded."

N. Y., Syracuse—SIGNAL STATION—See "Contracts Awarded."

N. Y., Watertown—STADIUM—See "Contracts Awarded."

N. B., St. George—WHARF—Sept. 11, by Secretary Dpt. P. Wks., Ottawa, Ont., constructing wharf extension. $40,000. K. M. Cameron, Ottawa, Ont., engr.

CONTRACTS AWARDED

Calif., San Francisco—PIPE YARD—S. J. Hester, secy. Dpt. P. Wks., City Hall, rehabilitating municipal pipe yard at 6th and Hubbell Sts., to M. J. Lyneh, 1435 Church St., $43,38[illegible] Bids Aug. 8, awarded Aug. 24. Noted Aug. 9

Conn., New Britain—SUBWAY—City, P. Wks. Dpt., City Hall, constructing 2,000 ft. subway in Black Rock Ave. from Corbin Ave. to West Main St. and 110 ft. West Main, also 600 ft. from South Burritt to North Burritt Sts., involving new sidewalk and repairing residence damage to steps, etc., $61,710. Owner building, J. J. Burns, foreman, G. J. Moelleur, superv. F.E.R.A. Project.

La., Shreveport—FIRE ALARM SYSTEM—City, to Cohn Electric Co., Shreveport, material for radio system, $4,032***to Gamewell Co., Praetorian Bldg., Dallas, Tex., fire alarm boxes, $8,000***to Interstate Electric Co., Shreveport, cable $7,254; protector board $1,800; switchboards $6,000. Grand total $27,086. All construction work by day labor. **P.W.A.**

†**Md., Annapolis**—PUMP and PIPING—Yards & Docks, Navy Dpt., Wash., D. C., pump installation and piping, to Lorne Plumbing & Heating Co., 641 West Congress St., Detroit, Mich., $3,366.

Minnesota—GAS PIPE LINE—Minneapolis Gas Light Co., J. K. Swanson, mgr., 800 Hennepin Ave., Minneapolis, 10 mi. gas pipe line from Mendota to Minneapolis, and installing mixers for blending natural gas with manufactured water gas, by day labor; also Northern Natural Gas Co., 231 South LaSalle St., Chicago, Ill., 16 mi. gas pipe line from Rosemount to Mendota, and constructing compressor station, by day labor. $1,500,000-$2,000,000.

N. M., Albuquerque—STADIUM—Bd. Regents University of New Mexico, c/o J. J. Dempsey, pres., completing stadium building, to Mead & Mount, Denver Natl. Bank Bldg., Denver, Colo., $32,300. **P.W.A.** Noted Apr. 20, 1933.

N. Y., Brooklyn—STATION FINISH—Bd. Transportation, J. H. Delaney, chn., 250 Hudson St., New York, constructing station finish work for York Street Station, to Shaw Constr. Co., 3207 Grand Ave., Astoria, $69,214. Bids Aug. 7. Noted July 26.

N. Y., Brooklyn—TRACK INSTALLATION —Bd. Transportation, J. H. Delaney, chn., 250 Hudson St., installing tracks on Fulton St. from Nostrand to Rockaway Aves., to T. H. Reynolds Contr. Co., 41-26 24th St., Long Island City, $198,431. Bids July 31. Noted July 12.

N. Y., Long Island City—COMFORT STATIONS—G. U. Harvey, pres., Queens Boro. Queens Subway Bldg., constructing 3 comfort stations along Rockaway Boardwalk, to Palmo Constr. Co., 105-12 101st St., Ozone Park, $19,775; plumbing, to T. F. Mulligan, 45-28 11th St., $10,500. Bids July 23. Noted July 19.

N. Y., New York—TRACK and CONTACT RAIL—Bd. Transportation, J. H. Delaney, chn., 250 Hudson St., installing track and contact rail for Queens Subway under Bway., to Fairecroft Eng. Co., 16 Court St., Brooklyn, $374,000. Bids Aug. 7. Noted July 26.

N. Y., Schenectady—OIL PLANT—Richfield Oil Co., 22 East 42nd St., New York, 10,000 and 40,000 bbl. capacity storage tanks, addition to bulk oil plant, to Chicago Bridge & Iron Co., 165 Bway., New York. Est. $30,000 or more.

N. Y., Syracuse—SIGNAL STATION—New York Central R.R. Co., W. J. Pfau, ch. engr., 466 Lexington Ave., New York, constructing signal station, day labor and separate contracts, to exceed $100,000.

N. Y., Watertown — STADIUM — City, wood, steel, concrete stadium and field house, day labor, $50,000. Work and materials by F.E.R.A. funds. F. O'Brien, city engr.

Que., Father Point—WHARF REPAIRS—Dpt. P. Wks., Ottawa, wharf repairs, to R. Lemieux Ltd., Rimouski, $20,811. Est. $25,000.

MATERIALS AND EQUIPMENT

PROPOSED WORK

MOTOR FIRE FIGHTING APPARATUS—**Irvington, Calif.**—Irvington County Fire Protection Dist. plans to form district to finance purchase of motor fire fighting apparatus. To exceed $5,000.

TRUCK CHASSIS — **Los Banos, Calif.** — City plans purchasing 3 or more ton truck chassis for West Side Union High School.

GAS LINE MATERIAL—**Colorado Springs, Colo.**—See "Unclassified."

ROAD OIL—**Fairfield, Conn.**—Town, J. Ferguson, First Selectman, Town Hall, appropriated $7,000 for purchase of road oil.

SEWER FLUSHING SEMI-TRAILER—**Chicago, Ill.**—Dpt. P. Wks., 420 City Hall, rejected bids sewer flushing semi-trailer. $3,500. Will readvertise. O. E. Hewitt, city clk.

TANK—**St. Louis, Mo.**—Coal Service Co., 2231 Papin St., applied for permit to install one 1,000 gal. underground tank at 2231 Papin St.

†*Federal Government.*

Materials, etc. (Continued)

PIPE, etc.—Randolph, N. Y.—Village, F. Merchant, mayor, soon takes bids 5,280 lin.ft c.i. pipe, connections, hydrants, etc., in connection with improving water supply system. $1,500. Noted Apr. 26, under "Waterworks."

FIRE APPARATUS—Brockville, Ont.—City Engineer bids this fall, new apparatus for Fire Dpt. **$14,000.**

BIDS ASKED

AGGREGATES, etc.—Indiana—Sept. 11, by J. D. Adams, chn. State Hy. Comn., Indianapolis, 300-600 tons crushed aggregates or gravel; 85,000 gal. road oil delivered and applied; 1,500-2,000 metal sign posts.

TRUCK—Grand Rapids, Minn.—Sept. 11, by Itasca Co., purchasing or renting with privilege of purchasing later one 4-5 ton truck.

†**TELEPHONE CABLE—Brooklyn, N. Y.**—Sept. 19, by Signal Supply Officer, Army Base, 58th St. and 1st Ave., 4,670 ft. telephone switchboard cable.

ASPHALT SURFACE HEATERS—New York, N. Y.—Sept. 12, by S. Levy, pres. Manhattan Boro, Municipal Bldg., asphalt surface heaters in various streets and avenues of Manhattan during Sept. 13 to Dec. 31, 1934.

†**RADIO-BEACON SYNCHRONIZERS — St. George, N. Y.**—Sept. 17, by Superintendent Lighthouses, St. George, 16 radio beacon synchronizers.

PUMPING UNIT—Reynoldsville, Pa.—Sept. 10, by Boro Council, 1 steam driven pumping unit, 350 to 400 g.p.m. capacity, 125 lbs. discharge, 110 lbs. steam pressure, atmospheric exhaust.

†**HYDRAULIC TURBINES—Knoxville, Tenn.**—Oct. 8, by Tennessee Valley Authority, two 66,000 hp. vertical shaft, plate steel spiral scroll case, single runner hydraulic turbines for Norris Power Plant and one 45,000 hp. vertical shaft, concrete spiral casing single automatically adusted propeller type runner hydraulic turbine for Wheeler Power Plant. C. H. Garity, dir.

†**PORTLAND CEMENT—Knoxville, Tenn.**—Sept. 17, by Tennessee Valley Authority, Type B portland cement for Norris and Wheeler Dams and for future needs of Tennessee Valley Authority. C. H. Garity, dir. Purchases.

CONTRACTS AWARDED

CAST IRON PIPE, etc.—Chicago, Ill.—City, Dpt. P. Wks., City Hall, 868 tons 4- to 12-in. c.i. pipe, to Glamorgan Pipe & Fdry. Co., 122 South Michigan Ave., $46,389***2,800 ft. 12 conductor 500 volt No. 8 rubber insulated lead sheathed cable, to American Steel & Wire Co., 231 South LaSalle St., $2,938***985 tons 12 in. x 12 ft. and 375 tons 16 in. x 12 ft. c.i. water pipe, to U. S. Pipe & Fdry. Co., 122 South Michigan Ave., $63,000***20 and 27 in. vitr. sewer pipe and fittings, to General Building Material Co., 4808 Wilson Ave., $71,063*** 3- to 15-in. vitr. sewer pipe, to Consumers Co., 111 West Washington St., not to exceed $4,000. Grand total $187,389. **P.W.A.** Bids July 20.

TAR—Springfield, Mass.—City, City Clerk, Administration Bldg., furnishing, applying 53,000 gal. hot tar on various streets, to American Tar Co., 111 Howard St., 10.94c. per gal. Awarded **Aug. 22.**

BRICK — Minneapolis, Minn. — City, F. S. Gram, purch. agt., 29,700 face brick and 28,000 hard stone brick for Water Dpt., to Twin City Brick Co., 529 2nd Ave. S., $929 and $322 respectively. Bids Aug. 22.

†**HYDRAULIC TURBINE, etc.—Albuquerque, N. M.**—Supervising Engineer, hydraulic turbine and governor, for U. S. Indian Irrigation Serv., 308 Federal Bldg., to S. Morgan Smith, York, Pa., $4,966; generator, to Ideal Electric & Mfg. Co., Manfield, O., $2,680. Bids Aug. 9.

CONTACT RAIL, etc.—New York, N. Y.—Bd. Transportation, J. H. Delaney, chn., 250 Hudson St., protection board brackets and splice plates, to Ross Galvanizing Wks., Brooklyn, $11,938 ***and contact rail insulators, to Ohio Brass Co., 50 Church St., $20,379***contact rail insulators, cups and caps, etc., to Acme Steel & Malleable Iron Co., 92 Liberty St., $6,788*** contact rail appurtenances, to W. G. Creamer & Co., 572 Smith St., Brooklyn, $13,705. Grand total $52,810. Bids Aug. 15. Noted Aug. 2.

TREATED TIES—New York, N. Y.—Bd. Transportation, J. H. Delaney, chn., 250 Hudson St., New York, treated ties, Order 21, to Eppinger & Russell, 80 8th Ave., $144,736. Bids July 31. Noted July 26.

DUMP BODIES—Raleigh, N. C.—Division Purch. & Contr., A. S. Brower, dir., fifty 1½ cu.yd. steel dump trucks, to Charlotte Wagon & Auto Co., 1401 South Mint St., Charlotte, $5,050. Bids Aug. 23.

†*Federal Government.*

FOREIGN

China, Kwangtung—Provincial Government of Kwangtung, making plans steel plant, incl. coke plant and rolling mills, $10,000,000. A. G. McKee & Co., 2430 Euclid Ave., Cleveland, O., engrs. and archts.

England—Woolwich Town Engineer preparing plans 458 houses, $677,500***Erith** Urban Council bids in September 500 houses, $732,500.

Manchukno, Mukden—Authorities plan constructing university, $1,250,000. Foreign contractors will be asked to tender.

Panama, Puerto Armuelles—United Fruit Co., Boston, Mass., plans docks and terminal, to replace facilities destroyed in earthquake. Est. about $300,000. **Maturity indefinite.**

Scotland, Dalry—Gallway Water Power Bd., constructing dams, aqueducts at buildings over River Ken, to A. M. Carmichael, Edinburgh, $1,100,000.

Scotland, Glasgow—Chairman Educ. Committee bids in September school on Clevedon Rd. $500,000.

Scotland, Glasgow—S. Pitt & Co., 95 Bath St., in market sulphate of ammonia, 20% duty.

Union Socialist Soviet Republics—Commissariat of Heavy Industry, Moscow, or c/o Amtorg Trading Corp., 261 5th Ave., New York, plans ball-bearing plant, 24,000,000 bearings annual capacity. Location not decided. To exceed $3,000,000.

Union Socialist Soviet Republics—Commissariat of Heavy Industry, Moscow, or c/o Amtorg Trading Corp., 261 5th Ave., New York, constructing 2 plants for manufacturing synthetic rubber (alcohol or coal tar products base), by day labor. To exceed $500,000.

Union Socialist Soviet Republics—Commissarit of Rail Transportation, Moscow, c/o Soviet Government or Amtorg Trading Corp., 261 5th Ave., New York, constructing 6 car repair plants and 100 locomotive and car depots, by day labor, to exceed $1,000,000; Commissarit of Heavy Industry, Soviet Govt., Moscow, or c/o Amtorg Trading Corp., 261 5th Ave., New York, group of plants for manufacturing textile machinery by day labor, to exceed $2,000,000.

U.S.S.R., Leningrad—Soviet Government, Moscow, or c/o Amtorg Trading Corp., 261 5th Ave., New York, constructing central heating plant, called Moscow-Narvsk Station, by day labor. To exceed $1,000,000.

Uruguay, Montevideo—Jan. 15, by Ministry of Public Works, hydro-electric development on Rio Negro. Plans and specifications may be obtained from nearest legation or consulate. Tenders to be in Spanish and work to commence not later than June 1, 1935***Government, Montevideo, soon takes bids (1st units) seabase, extending breakwater, hangar, shelter, hotel, executive posts, telegraph offices swimming pools and sports, at Libertad Island, $1,200,000.

PUBLIC BUILDINGS

PROPOSED WORK

†**Ala., Brewton**—Treas. Dpt. at office Sup. Archt., Wash., D. C., plans post office. Site selected.

Calif., Bakersfield—Bakersfield Union High School Dist., election Sept. 14, $300,000 bonds, school auditorium. C. H. Biggar, Haberfeld Bldg., archt.

Calif., Compton—Compton Union High School Dist., soon takes bids 2 story, 190x225 ft. administration building, incl. 40x95 ft. auditorium, concrete, structural steel construction. $300,000-$350,000. Austin & Ashley, 608 Chamber of Commerce Bldg., Los Angeles, archts. Noted Apr. 12.

†**Calif., Huntington Park**—Treas. Dpt. at office Sup. Archt., Wash., D. C., plans U. S. Post Office. Site selected.

Calif., Long Beach—Long Beach Bd. Educ., W. Barber, secy., soon takes bids incl. science study hall, library, classroom, administration and shop buildings for David Starr Jordan High School. $199,000. M. C. Parker, 1071 East Bway., archts.

Calif., Norwalk—Bd. Public Building Reconstruction rejected bids Aug. 7, 100x100 ft. for school and classroom for Norwalk Elementary School Dist. Will probably readvertise next week. T. C. Kistner, 814 Architects Bldg., Los Angeles, archt. Noted Aug. 23.

Calif., Placentia—Los Angeles Bd. Educ. defeated $200,000, for high school. T. C. Kistner, 814 Architects Bldg., Los Angeles, archt.

Calif., Redwood City—San Mateo Co. plans by W. H. Toepke, 74 New Montgomery St., San Francisco, 4 story, rein.-con. office building. $146,000. $46,000 P.W.A. grant and balance to be voted by county to finance construction.

†**Calif., San Pedro**—Treas. Dpt. at office Sup. Archt., Wash., D. C., bids within 60 days, constructing 3 story, 100x250 ft. federal building to house post office, customs department, immigration station, public health service steamboat inspection service, shipping commission and hydrographic office. $500,000. G. B. Kaufman, 610 Union Bank Bldg., Los Angeles, and W. H. Austin, 532 Chestnut Ave., Long Beach, archts. Noted Aug. 10.

Calif., Santa Maria—Santa Barbara Co. plans branch county courthouse. $125,000. Will seek Federal Aid to finance same.

Calif., Tulare—Tulare Union High School Dist. plans by W. D. Coates, Rowell Bldg., new auditorium. $110,000. P.W.A. allocated grant of $43,500. Noted Apr. 19.

Calif., Tulare—Tulare Union High School Dist. plans twenty-eight one-room bungalow schools, $35,000 or frame and stucco bungalows, $110,000 or central unit, $60,000. District has $40,000 available for construction, present main building ordered closed by State Dpt. Architecture as not complying with earthquake law.

Colo., Rifle—City plans election $70,000, for diesel power plant. P.W.A. project. E. Harrison Thwaits, 357 Lafayette St., Denver, engr.

†**Conn., New Milford**—Treas. Dpt. at office Sup. Archt., Wash., D. C., making plans brick, stone U. S. Post Office, Main St. near Church St. $60,000.

†**Conn., Thompsonville**—Treas. Dpt. at office Sup. Archt., Wash., D. C., plans 1 story, basement, brick, steel post office. $81,000. Bids Sept. 4 for site.

†**Ga., Cairo**—Treas. Dpt. at office Sup. Archt., Wash., D. C., plans U. S. Post Office. Site selected.

†**Ga., Calhoun**—Treas. Dpt. at office Sup. Archt., Wash., D. C., plans post office. Site selected.

†**Ga., Waycross**—Treas. Dpt. at office Sup. Archt., Wash., D. C., rejected bids Aug. 1, extending U. S. Post Office. Noted July 3 Daily.

†**Idaho, Blackfoot**—Treas. Dpt. at office Sup. Archt., Wash., D. C., plans U. S. Post Office. Site selected.

Ill., Belleville—St. Clair Co. plans new 3 story (ultimately 4 story), basement, jail, on site of present jail, Washington and 1st Sts. $230,000 allotted by P.W.A. Election in November to vote bond issue.

†**Ill., Brookfield**—Sept. 12, by Treas. Dpt. at office Sup. Archt., Wash., D. C., constructing U. S. Post Office.

Ill. Centralia—City election about Oct. 17, for proposal to construct, maintain and operate a municipal light and power plant. $477,000. P.W.A. allotted $117,000 grant and $360,000 loan. Plans issuing $360,000 in public utility certificates to be used as collateral for P.W.A. loan of $360,000. Baumes-McDevitt Co., 1871 Railway Exch. Bldg., St. Louis, engrs.

†**Ill., Eldorado**—Treas. Dpt. at office Sup. Archt., Wash., D. C., plans post office building. Site selected.

Ill., Sullivan—City will not build artificial gas plant and distribution system. $79,500 grant and loan rescinded by P.W.A. J. A. McBride, Mechanical Equipment Co., 2815 Locust St., St. Louis, Mo., engrs. Noted May 3.

†**Ind., Indianapolis** — United States Housing Div., Wash., D. C., plans by Russ & Harrison, 1001 Architects Bldg., Indianapolis, housing project, Indiana Ave. and Blake St. $2,500,000.

†**Ind., Martinsville**—Treas. Dpt. at office Sup. Archt., Wash., D. C., plans U. S. Post Office. Site selected.

Ia., Ames—Independent School Dist., **F. B.** Howell, secy., election Sept. 28, $100,000, rein.-con., brick, stone, Junior High School, 5th and Clark Sts. $250,000, $59,000 grant and $100,000 loan allotted by P.W.A. Tinsley, McBroom & Higgins, 702 Hubbell Bldg., Des Moines, archts. Noted Aug. 2.

†**Ia., Mount Pleasant**—Treas. Dpt. at office Sup. Archt., Wash., D. C., plans U. S. Post Office. Site selected.

Kan., Hoistington—City plans power plant. $150,000. W. B. Rollins & Co., 329 Railway Exch. Bldg., Kansas City, Mo., engrs.

Kan., Manhattan—Kansas State College of Agriculture & Applied Science, F. D. Farrell, pres., plans by own Dpt. of Architecture and State Architect, Topeka, rebuilding brick, concrete Denison Hall, chemistry physics building. $200,000 fire loss. Noted Aug. 16.

†**La., Winnfield**—Treas. Dpt. at office Sup. Archt., Wash., D. C., plans U. S. Post Office. Site selected.

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Public Buildings (Continued)

†**Me., Farmington**—Treas. Dpt. at office Sup. Archt., Wash., D. C., plans post office. Site selected.

Md., Baltimore—City, Dpt. P. Wks., Bureau Buildings, Municipal Bldg., plans laundry and equipment, X-ray department and equipment and superintendent's residence, at City Hospitals. $125,000. Palmer & Lamdin, 513 North Charles St., archts. Approved by Pub. Impvt. Com.

Md., Baltimore—City, Dpt. P. Wks., Municipal Bldg., plans by John Russell Pope, 542 5th Ave., New York, 1 story, basement, two additional wings, for art museum. $150,000. **Maturity indefinite.**

Md., Glendale—Comn. of Dist. of Columbia, Dist. Bldg., Wash., D. C., plans by Architect of D. C., Municipal Bldg., Wash., D. C., 2 story, basement, hospital. $1,500,000. Funds allotted.

†**Mass., Beverly**—Treas. Dpt. at office Sup. Archt., Wash., D. C., rejected bids U. S. Post Office. Noted May 31.

†**Mass., Chelsea**—Treas. Dpt. at office Sup. Archt., Wash., D. C., rejected bids July 12, medical officers' quarters and garage at U. S. Marine Hospital. Noted Jan. 24 Daily.

Mass., Westminster — Town, Bd. Selectmen, Town Hall, plans by O. A. Thayer, 89 Franklin St., Boston, 2 story, basement, 109x112 ft., brick grade school, concrete found. P.W.A. Project Docket 6267. To exceed $105,000.

Mass., Westport—Town, M. Earl, supt. Schools, Town Hall, plans new high school or high school addition. To exceed $150,000. Architect not definitely appointed. Project will be decided upon at Town Meeting held during March, 1935.

Mich., Eloise—Bd. Supervs. Wayne Co., County Bldg., plans by N. O. Gould, Empire Bldg., Detroit, 3 story, basement, rein.-con., brick, steel employees building for Wayne Co. Poor Comn. Institution, plain found., Michigan Ave. P.W.A. approved $905,000 loan.

Mich., Morenci—Village plans power plant. $146,000 P.W.A. allotment. G. C. Dailey, Morenci, engr. Noted Oct. 19.

Minn., Fairfax—Municipality plans electric power plant. To exceed $60,000.

†**Miss., Indianola**—Treas. Dpt. at office Sup. Archt., Wash., D. C., plans U. S. Post Office. Site selected.

†**Miss., Louisville**—Treas. Dpt. at office Sup. Archt., Wash., D. C., plans U. S. Post Office. Site selected.

Mo., Moberly—City indefinitely postponed constructing light and power plant addition, two 2,000 kw. turbo-generators, electric distribution system, etc. $700,000 P.W.A. grant and loan rescinded. Russell & Axon, 4903 Delmar Blvd., St. Louis, engrs. Noted Aug. 2.

Mo., St. Charles—City, rejected application $350,000 P.W.A. loan and grant for light and power plant. Russell & Axon, 4903 Delmar Blvd., St. Louis, engrs. Noted July 27, 1933.

N. J., Bridgewater—Bd. Educ. bids about October, school. $300,000. $245,000 P.W.A. loan. Bonds voted. A. V. Cook, 31 Park Pl., Morristown, archts.

N. J., Newark—Bd. Freeholders Essex Co., E. A. Harris, chn. Prison & Detention House Com., Court House, plans county prison and detention building. $1,000,000.

N. J., Point Pleasant—Bd. Educ., bids in fall, school. $105,000. Coffin & Coffin, 522 5th Ave., New York, archts. Waiting P.W.A. grant and loan. Noted Dec. 5.

N. J., Red Bank—Bd. Educ. plans River Street School addition, $121,700; and Harding Street School addition, $69,150. P.W.A. project. E. Arend, Mattison Ave., Asbury Park, engr.

†**N. J., Ridgefield**—Treas. Dpt. at office Sup. Archt., Wash., D. C., plans U. S. Post Office. Site selected.

†**N. J., Union City**—Treas. Dpt. at office Sup. Archt., Wash., D. C., plans by J. G. Helmers, 165 Summit Ave., post office. $190,000.

†**N. Y., Brooklyn**—Treas. Dpt. at office Sup. Archt., Wash., D. C., plans U. S. Post Office. Site selected.

N. Y., Eastchester—Bd. Educ. bids in October, Waverly School. $136,000. P.W.A. loan granted. Tooker & Marsh, 101 Park Ave., New York, archts. Noted Mar. 29.

N. Y., Elmira—Dpt. Correction, State Office Bldg., Albany, plans completed by W. E. Haugaard, State Office Bldg., Albany, and soon takes bids power house, coal handling equipment, service connections, Elmira State Reformatory. $540,000. $162,000 loan granted by P.W.A. T. E. Farrell, State Office Bldg., Albany, engr.

N. Y., Franklin Square—Bd. Educ., Town of Hempstead, bids in October, school. $291,000. P.W.A. project. Knappe & Morris, 192 Lexington Ave., New York, archts. Noted Apr. 5.

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N. Y., Hempstead—Bd. Educ. bids late in October or thereafter altering Merrick School. $185,000. P.W.A. project. W. H. Spaulding, 163-18 Jamaica Ave., Jamaica, archts. Noted Aug. 2.

N. Y., Mahopac—Village bids in October, school. $370,000. P.W.A. loan granted. Knappe & Morris, 192 Lexington Ave., New York, archts. Noted July 19.

N. Y., Malverne—Malverne School Bd., election Sept. 21, $251,000 constructing school addition, Ocean St. Noted Aug. 2.

N. Y., Monticello—Bd. Educ. bids in October, general contract school. $337,000. P.W.A. project. Tooker & Marsh, 101 Park Ave., New York, school. Noted Apr. 5.

N. Y., New York—Dpt. Hospitals, Municipal Bldg., revised plans by McKim, Mead & White, 101 Park Ave., 8 story, 212x365 ft. tuberculosis hospital at Bellevue Hospital, East River, 26th to 29th Sts. $3,000,000. P.W.A. project. **Maturity soon.**

N. Y., Seaford—Bd. Educ., Town of Hempstead, bids in October, school. $165,000. P.W.A. loan granted. Knappe & Morris, 192 Lexington Ave., New York, archts. Noted Apr. 5.

N. Y., Tottenville—Bd. Educ., 50 Park Ave., New York, soon takes bids high school, Bridgeton, Summit, Arlington and Yetman Aves. $976,000. P.W.A. project. W. C. Martin, Flatbush Ave. extension and Concord St., Brooklyn, archt.

N. Y., Yorktown Heights—Bd. Educ. bids in October, school. $310,000. P.W.A. project. Knappe & Morris, 192 Lexington Ave., New York, archts. Noted Apr. 5.

†**N. C., Albemarle**—Treas. Dpt. at office Sup. Archt., Wash., D. C., plans U. S. Post Office. Site selected.

†**O., Geneva**—Treas. Dpt. at office Sup. Archt., Wash., D. C., plans U. S. Post Office. Site selected.

†**Okla., Henryetta**—Treas. Dpt. at office Sup. Archt., Wash., D. C., plans post office building. Site selected. Noted Aug. 2.

Ore., Corvallis—Bd. Directors Dist. 9, rejected bids Aug. 14, constructing high school. $300,000.

Ore., Klamath Falls—City, rejected bids Aug. 20, 3 story armory. Noted Aug. 9.

†**S. C., Conway**—Treas. Dpt. at office Sup. Archt., Wash., D. C., plans U. S. Post Office. Site selected.

†**Tenn., Erwin**—Treas. Dpt. at office Sup. Archt., Wash., D. C., plans U. S. Post Office. Site selected.

Tenn., Knoxville—Public Schools of Knoxville, plans by R. F. Graf & Sons, Bauman & Bauman, 813½ Market St., and Barber & McMurray, General Bldg., for 7 room addition to Beaumont Elementary School, $40,000; replacement of part of Park City Lowry Elementary School, $150,000, and new North Knoxville Junior High School, $210,000. P.W.A. allotted $406,000. Noted Aug. 9.

†**Tenn., Lewisburg**—Treas. Dpt. at office Sup. Archt., Wash., D. C., plans U. S. Post Office. Site selected.

†**Tenn., McKenzie**—Treas. Dpt. at office Sup. Archt., Wash., D. C., plans U. S. Post Office. Site selected.

†**Tenn., Milan**—Treas. Dpt. at office Sup. Archt., Wash., D. C., plans U. S. Post Office. Site selected.

†**Tenn., Trenton**—Treas. Dpt. at office Sup. Archt., Wash., D. C., plans constructing U. S. Post Office, 1st and College Sts. $75,000.

Tex., Brownsville—City, c/o R. B. Renfro, mayor, rejected bids Aug. 14 for municipal improvements, incl. 2 steel forced draft stacks for boilers, steel truss, concrete deck roof over generating room at municipal power plant and extension plant, water pumping plant complete, with 1 each of 12 in., 16 in., and 20 in. motor driven pumps with clutched drive to gasoline engine for 16 in. pump, concrete and galv. iron pump house, 3,400 ft. concrete lined canal and earth reservoir approximately 50,000 cu.yd. earth excav., transmission line equipment, spray pond equipment, generator and boiler room instruments and equipment H. E. Elrod, 316 Petroleum Bldg., Houston, engr. P.W.A. project. Work will probably be done by city forces. Noted Aug. 9.

†**Tex., Kingsville**—Treas. Dpt. at office Sup. Archt., Wash., D. C., rejected bids Aug. 7, U. S. Post Office. Noted July 19.

†**Tex., Lockport**—Treas. Dpt. at office Sup. Archt., Wash., D. C., plans U. S. Post Office. Site selected.

Tex., Tyler—City, c/o L. H. Powell, mayor, voted $135,000, brick, concrete hospital, plain found., $187,300. S. Simons, Citizens Bank Bldg., archt. Noted July 26.

Utah—Cache Co. School Dist., Logan, plans new schools at Mendon and New Princeton; high school additions at Richmond and Hyrum, and physical education building at Wellsville and Lewiston. $213,000. P.W.A. loan granted. K. C. Schaub, Logan, archt.

Utah, Ogden—City Bd. Educ., plans by L. J. Hodgson, 505 Eccles Bldg., Ogden, high school. $884,700 P.W.A. loan granted.

†**Va., Onancock**—Treas. Dpt. at office Sup. Archt., Wash., D. C., plans post office building. Site selected.

†**Wash., Kelso**—Treas. Dpt. at office Sup. Archt., Wash., D. C., plans U. S. Post Office. Site selected. Noted July 19.

†**W. Va., Richwood**—Treas. Dpt. at office Sup. Archt., Wash., D. C., plans post office building. Site selected.

†**Wis., Ladysmith**—Treas. Dpt. at office Sup. Archt., Wash., D. C., plans U. S. Post Office. Site selected.

Man., Brandon—Provincial Mental Hospital, plans by G. Parfitt, Winnipeg, addition to hospital. $165,000.

Que., Guelph—Dominion Govt. purchases site at $45,000 for constructing public building to cost $250,000.

BIDS ASKED

†**Ala., Anniston**—Sept. 17, by Treas. Dpt. at office Sup. Archt., Wash., D. C., extending and remodeling U. S. Post Office and Court House. Noted June 27.

Calif., Norwalk—Sept. 17, by Bd. P. Building Reconstruction, classroom building, $107,000. T. C. Kistner, 814 Architects Bldg., Los Angeles, archts.

†**Calif., Pittsburg**—Oct. 4, by Treas. Dpt. at office Sup. Archt., Wash., D. C., constructing U. S. Post Office. $68,200.

†**Calif., San Francisco**—Sept. 21, by Treas. Dpt. at office Sup. Archt., Wash., D. C., constructing plague laboratory, Marine Hospital Reservation.

†**Calif., Santa Clara**—Sept. 27, by Treas. Dpt. at office Sup. Archt., Wash., D. C., constructing U. S. Post Office. $40,500. Noted Mar. 23, 1933.

†**Conn., Meriden**—Sept. 11, by Treas. Dpt. at office Sup. Archt., Wash., D. C., furnishing, installing elevator and extending elevator shaft in U. S. Post Office

†**D. C., Wash.**—Yards & Docks, Navy Dpt., taking bids repairing and altering Naval Medical School, Spec. 7730.

†**Fla., Leesburg**—Sept. 18, by Treas. Dpt. at office Sup. Archt., Wash., D. C., constructing U. S. Post Office. Noted June 15.

†**Ga., Valdosta**—Sept. 18, by Treas. Dpt. at office Sup. Archt., Wash., D. C., constructing extension and remodeling U. S. Post Office Courthouse, etc. $90,000. Noted Mar. 8.

†**Ill., Carthage**—Sept. 18, by Treas. Dpt. at office Sup. Archt., Wash., D. C., constructing U. S. Post Office. $56,700.

†**Ill., Chicago**—Sept. 17, by Treas. Dpt. at office Sup. Archt., Wash., D. C., constructing concrete balustrade and retaining wall appraisers stores building.

†**Ill., Danville**—Oct. 2, by Vet. Bu. Arlington Bldg., Wash., D. C., altering and building additions at Veterans Administration Facility.

†**Ill., Fairfield**—Sept. 27, by Treas. Dpt. at office Sup. Archt., Wash., D. C., constructing U. S. Post Office. $60,500.

†**Ill., Normal**—Sept. 27, by Treas. Dpt. at office Sup. Archt., Wash., D. C., U. S. Post Office. $72,600. Noted May 24.

Ill., Springfield—Sept. 17, by City, power plant piping, instruments, etc., Burns & McDonnell Eng. Co., 107 West Linwood Blvd., Kansas City, Mo., engrs.

Md., Catonsville—Spring Grove State Hospital, bids about Sept. 15, 2 story, basement, hospital. $110,000. H. P. Hopkins, 10 West Mulberry St., Baltimore, archt.

†**Mass., Boston**—Sept. 24, by Treas. Dpt. at office Sup. Archt., Wash., D. C., medical officers' double house at U. S. Marine Hospital. $33,000.

Mass., Worcester—Sept. 21, by City, G. A. Mac Iver, supt. City Hospital, 249 Belmont St., 2 story, basement, 114x130 ft., brick, steel, stone contagious disease ward, concrete found. Belmont St. $300,000. P.W.A. project. $84,000 grant approved. Fuller & Delano, 44 Front St., archts.

†**Minn., Litchfield**—Sept. 19, by Treas. Dpt. at office Sup. Archt., Wash., D. C., constructing U. S. Post Office. Noted Mar. 23, 1933.

†**Miss., Natchez**—Sept. 27, by Treas. Dpt. at office Sup. Archt., Wash., D. C., extending and remodeling U. S. Post Office. $50,000.

†**N. J., Haddonfield**—Sept. 18, by Treas. Dpt. at office Sup. Archt., Wash., D. C., constructing U. S. Post Office. $48,000. Noted Mar. 16, 1933.

†*Federal Government.*

Public Buildings (Continued)

†N. Y., Carthage—Sept. 27, by Treas. Dpt. at office Sup. Archt., Wash., D. C., U. S. Post Office. Noted June 28.

N. Y., Endicott—Village bids about Sept. 15, school, $380,000. A. T. Lacey & Son, Binghamton, archts. Noted July 19.

N. Y., Floral Park—Bd. Educ. bids in October, school, $390,000. P.W.A. loan granted. Knapp & Morris, 192 Lexington Ave., New York, archts. Noted Apr. 12.

†N. Y., New York—Oct. 2, by Treas. Dpt. at office Sup. Archt., Wash., D. C., constructing (except elevators), U. S. Federal Office Building, Vesey St. Noted June 28.

N. Y., New York—Sept. 12, by W. Morgan, comr. Markets, Municipal Bldg., extending refrigerating system; also Sept. 11, plumbing, drainage, gas and repaving work for 48 merchant stores, at Bronx Municipal Terminal Market, at Exterior and East 150th Sts.

N. Y., Oneonta—Sept. 13, by Dpt. Health, State Office Building, Albany, nurses' call system at hospital for treatment of tuberculosis. Spec. 8236.

†N. Y., Rensselaer—Sept. 20, by Treas. Dpt. at office Sup. Archt., Wash., D. C., constructing U. S. Post Office. $71,160.

†N. Y., Silver Creek—Sept. 18, by Treas. Dpt. at office Sup. Archt., Wash., D. C., constructing U. S. Post Office. Noted Apr. 5.

†O., Bryan—Sept. 27, by Treas. Dpt. at office Sup. Archt., Wash., D. C., constructing U. S. Post Office. $59,400.

†O., Monticello—Sept. 20, by Treas. Dpt. at office Sup. Archt., Wash., D. C., constructing U. S. Post Office. $49,500.

†Tex., Fort Sam Houston—Con. Q.M., bids about Sept. 5, materials and equipment for constructing 3 story, basement, 90x170 ft., theatre, incl. air conditioning plant, projection room, $90,000. Noted Aug. 23, under "Contracts Awarded."

†Tex., Shamrock—Sept. 24, by Treas. Dpt. at office Sup. Archt., Wash., D. C., U. S. Post Office. $50,700. Noted Feb. 15.

†Va., Quantico—Sept. 12, by Yards & Docks, Navy Dpt., Wash., D. C., relocating storehouse at Marine Barracks, incl. railroad spur tracks, Spec. 7765.

†Wash., Montesano—Sept. 25, by Treas. Dpt. at office Sup. Archt., Wash., D. C., constructing U. S. Post Office. $56,300.

Wash., Seattle—Sept. 13, by Bd. P. Wks., County-City Bldg., constructing power house for Diablo Power Project, incl. oil circuit breakers, disconnecting switches, auxiliary metal clad switchgear, wall bushings, station light, power and heat switchboard, distribution panels, cabinets, neutral circuit, rectifier equipment for switch operation, storage batteries, charging equipment M.G. sets, inverter, oil purifying and testing equipment, hydraulic metering equipment, and main unit instrument transformers.

CONTRACTS AWARDED

Conn., Monroe—Town, School Com., electrical work for 1 story, basement, 65x90 ft. school, to Eastern Electric Constr. Co., 1208 Stratfort Ave., Bridgeport, $4,600***general contract, to E. & F. Constr. Co., 94 Wells St., Bridgeport, $51,401***artesian well, to Shanley Bros., 44 Whitney Ave., Bridgeport. Total est. $105,000. **P.W.A.**

†D. C., Wash.—Treas. Dpt. at office Sup. Archt., Wash., D. C., removing and replacing elevators in Treasury Building, to Haughton Elevator & Machine Co., 1003 Vermont Ave. N.W., $51,477. Bids June 22. Noted June 7.

†D. C., Wash.—Treas. Dpt. at office Sup. Archt., Wash., D. C., changes, plumbing, etc., at National Institute of Health, to Centaur Constr. Co., 210 East 40th St., New York, $6,424. Bids Aug. 3.

Ill., Lake Forest—Deerfield Shields Twp. High School Dist. 113, North St., Johns Ave., Highland Park, general contract 2 and 3 story, rein.-con., brick high school, East McKinley Rd., to R. C. Wieboldt Co., 1412 West Washington St., Chicago. Est. $350,000. **P.W.A.** Noted July 19.

Md., Hagerstown—Buckler & Fenhagen, archts., 325 North Charles St., Baltimore, 6 story, basement, brick, rein.-con. hospital, plain found., for Washington Co. Hospital, to J. Henry Miller, Inc., Eutaw and Franklin Sts., Baltimore, $350,000; elevators, to Otis Elevator Co., 120 South Paca St., Baltimore. P.W.A. project. Bids Aug. 7. Noted July 26.

Mass., Boston—Commonwealth of Massachusetts, Dpt. P. Health, State House, Boston, constructing sprinkler system at Antitoxin and Vaccine Laboratory in Forest Hills, to C. H. Cronin, Inc., 14 Byron St., approximately $1,700. Bids Aug. 15, awarded Aug. 24.

†*Federal Government.*

†Mass., Franklin—Treas. Dpt. at office Sup. Archt., Wash., D. C., constructing U. S. Post Office, to M. J. Dyer & Co., Worcester, Mass., $34,549. Bids Aug. 8. Noted July 26.

Mass., Taunton—Commonwealth of Massachusetts, Dpt. Mental Diseases, State House, installing sprinkler system at Taunton State Hospital, to C. H. Cronin, Inc., 14 Byron St., $13,200. **P.W.A.** Bids Aug. 10, awarded Aug. 28.

Mass., Waltham—Commonwealth of Massachusetts, Dpt. Mental Diseases, State House, Boston, general contract 3 story, basement, 32x128 ft., 26x64 ft. and 36x55 ft. medical and surgical wings, at Metropolitan State Hospital, to Matthew Cummings Co., 43 Tremont St., Boston, $358,000. **P.W.A.** Bids Aug. 15, awarded Aug. 27. Noted July 26.

Mo., Kennett—City, diesel engine power plant and distribution system, to Fairbanks-Morse Constr. Co., 217 South 8th St., St. Louis, $148,125. **P.W.A.** Bids Aug. 15. Noted Aug. 9.

Mont., Butte—State Bd. Educ., c/o E. Ireland, secy., Missoula, plumbing and heating for 4 story students' resident hall and 2 story faculty resident hall at State School of Mines, to Western P. and H. Co., Butte, $37,870*** electrical work, to Western Electric Supply Co., Butte, $7,541***painting, to Ellis Paint Co., Butte, $4,943. Grand total $50,354. **P.W.A.** Bids Aug. 9.

†N. Y., Ellis Island—Treas. Dpt. at office Sup. Archt., Wash., D. C., remodeling immigration station, to B. Z. Contg. Co., 1123 Bway., New York, $49,169. Bids Aug. 3. Noted July 26.

N. Y., Lake Placid—Village, school, to W. E. Irish, McCarthy Bldg., Syracuse. Est. $375,000. **P.W.A.** H. O. Fullerton, 111 State St., Albany, archt.

N. Y., South Onondaga—Village general contract Central Junior and Senior High School, to W. Lyon & Son, Prospect St., Herkimer, $128,900; heating, to F. Bradt, 113 Oakwood Ave., Syracuse, $25,692***plumbing, to Moyer & Orr, 629 Tallman St., Syracuse, $12,262***electrical work, to Doster & Egan, Erie Blvd., Syracuse, $10,693. Grand total $177,547. **P.W.A.** Bids Aug. 14. Noted Aug. 9.

O., Plain City—Bd. P. Wks., furnishing, installing, diesel engine for water and light plant, to Fairbanks-Morse Co., 900 South Wabash Ave., Chicago, Ill., $33,722.

†S. C., Columbia—Building Committee Federal Land Bank, constructing 5 story farm credit administration building and altering present Federal Land Building, to J. C. Heslep, Columbia, $413,540. Bids Aug. 22. Noted Aug. 9.

Va., Blacksburg—Virginia Polytechnic Institute, faculty dormitory and social center at Virginia Polytechnic Institute, to Northeastern Constr. Co., Winston-Salem, N. C., $164,234.

COMMERCIAL BUILDINGS

PROPOSED WORK

Ala., Birmingham—Loveman, Joseph & Loeb, 212 North 19th St., plans by W. E. Lehman, 972 Broad St., Newark, N. J., and Muller & Martin, Birmingham, 4 story, basement, 120x140 ft. brick, steel, rein.-con. department store, plain found., 3rd Ave. and 19th St. $500,000.

Ill., Chicago—J. W. Carthy & Associates, archts., preparing plans 43 East Ohio St., 2 3 story, basement church, convent and social hall, Ashland St. and Leland Ave., for Sisters of Charity, Ashland St. and Leland Ave. $125,000.

N. Y., Brooklyn—Hebrew Old Age Society of Bensonhurst, 1870 76th St., bids after Dec. 1, general contract 4 story home for aged, 1870 76th St. corner 19th Ave. $125,000. J. Lubroth, 56 Court St., archt. Noted Aug. 16.

N. Y., Brooklyn—H. Lefrack, 897 Empire Blvd., plans by Kavy & Kavovitt, 16 Court St., group of dwellings, Winthrop and 94th Sts. $100,000 or more.

N. Y., Flushing—Sunlind Homes, H. Kasper, in charge, 1684 Carroll St., plans group of 40 dwellings on North Hempstead Turnpike. To exceed $100,000.

N. Y., New York — Astor Theatre Realty Corp., 1531 Bway., bids after Oct. 1, altering theatre, $150,000. T. W. Lamb, 701 7th Ave., archt. Noted Aug. 16.

N. Y., New York—L. Cowan, 110 East 42nd St., plans by A. Weiser, 120 East 41st St., plans altering apartment 929 Park Ave. To exceed $100,000.

N. Y., New York—Fort Independence Realty Corp., 271 Madison Ave., plans by E. J. Kahn, 2 Park Ave., 6 story apartment, Spuyten Duyvil Rd. and 230th St. $260,000.

N. Y., New York—**F. Mescia**, 58 East 8th St., will not alter heating and plumbing in store and apartment, 14th St. near 4th Ave. $30,000 or more. Project abandoned. Noted Aug. 16.

N. Y., Syracuse—New York Central R.R. Co., J. W. Pfaff, ch. engr., 466 Lexington Ave., New York, making plans 4 story, 95x150 ft., gray limestone or cast stone passenger station with 3 story wings. $500,000. **Maturity late in February.** Private plans.

O., Toledo—Metropolitan Housing Authority, C. F. Weller, chn., plans by British & Metzger, Nicholas Bldg., and Langdon Hohly & Gram, Security Bank Bldg., for housing and slum development, $7,000,000. Plans to be submitted to P.W.H. Corp. in Washington.

Pa., Phila.—Hill-creek Homes Corp. has withdrawn request for loan from P.W.A. for housing project. **Maturity indefinite.** Noted Oct. 19.

Tex., Dallas—Adolphus Hotel Co., Commerce St., plans by Green, La Roche & Dahl, Insurance Bldg., redecorating and remodeling entire structure of Adolphus Hotel, Commerce St. $500,000.

Tex., Dallas—Gulf States Security Ins. Co., Ackard and Main Sts., plans by Lang & Winchell, 1st Natl. Bank Bldg., 6 story, brick, rein.-con. top addition to office building, Main St., $300,000.

Tex., Dallas—Miss Ela Hockaday, 2407 Greenville Ave., soon takes bids Junior College, 3 story, Greenville St., $150,000. M. Lemmon, Tower Petroleum Bldg., archt.

Tex., Kilgore—Mrs. Pendleton, Kilgore, and W. A. Chambers, Dallas, plans by Green La Roche & Dahl, engrs. and archts., Insurance Bldg., Dallas, 4 story, 100x115 ft., rein.-con., brick, tile hotel, $125,000.

Ont., London—Canadian Natl. Railways, T. T. Irving, ch. engr., Union Sta., Toronto, plans 2 story, 100x1250 ft., brick, steel, concrete station, $400,000.

BIDS ASKED

Mo., St. Louis—A. F. and A. Stauder, archts., 6032 South Kingshighway Blvd., bids about Sept. 15, 2 story, basement, 59x109 ft., brick, steel church and school, Tamm and Murdoch Aves., for St. Gabriel the Archangel Roman Catholic Church, c/o F. H. Skaer, pastor, 5666 Liscette Ave., $75,000-$105,000. Noted July 26.

N. Y., Binghamton—Our Lady of Lourdes Memorial Hospital bids about Sept. 15, 3 story hospital, $190,000. A. T. Lacey & Son, 52 Exchange St., archts.

N. Y., New York—**S. H. Kress & Co.**, 114 5th Ave., bids about Nov. 15, department store. To exceed $105,000. E. F. Silbert, 114 5th Ave., archt. Noted Aug. 16.

CONTRACTS AWARDED

Ind., Evansville—Courier Publishing Co., Main St., heating and plumbing for building, to Long & Smith, Evansville. Est. $12,000.

N. J., Jersey City—Stratford Assn., A. C. Stratford, pres., 120 Montgomery St., general contract 8 apartments and garages, to Deakman Wells Co., 921 Bergen Ave., $1,567,673. H. A. Kelly & J. B. Petersen, 921 Bergen Ave., archts.

Tex., Tyler—E. O. Young Production Dpt., Houston, 3 story, brick, rein.-con. office building, to Eckert Burton Constr. Co., Burt Bldg., Dallas. Work started.

INDUSTRIAL BUILDINGS

PROPOSED WORK

Ala., Wylam — ROOFING PLANT — Barrett Co., 40 Rector St., New York, plans rebuilding roofing plant damaged by fire. To exceed $40,000. Architect not appointed.

Calif., Bakersfield — BREWERY — Bakersfield Brewing Co., 1660 Chester Ave., plans brick, steel, 16th St. To exceed $100,000.

Calif., Escondido—PACKING HOUSE—Escondido Orange Assn., W. L. Carson, mgr., sketches by W. W. Ache, 1616 4th Ave., Los Angeles, rein.-con., steel packing house, incl. installing pre-cooling system, $150,000.

Calif., Lindsay—FACTORY—Lucca Olive Oil Co. (L. M. Drew), Lindsay, plans rebuilding brick factory, destroyed by fire, $40,000 incl. equipment.

Calif., Los Angeles—BAKING PLANT—Helms Bakery Ltd., 8800 Venice Blvd., plans 2 and part 3 story, 56x155 ft., rein.-con., steel addition, 8800 Venice Blvd., $50,000. Grant & Bruner, 607 Ferguson Bldg., engrs. and archts. Equipment will cost an additional $50,000.

Calif., Santa Rosa—BREW HOUSE—Grace House, Santa Rosa, plans 3 story, 40x40 ft., rein.-con. brew house, L. H. Nishkian, 525 Market St., San Francisco, engr.

Connecticut—PLANT—National Non-Skid Tire Chain Corp., c/o O. W. Dale, Inglewood, Calif., plans plant and distribution, location undisclosed. To exceed $28,000.

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Industrial Buildings (Continued)

Fla., Tampa—REFINERY—Peninsular Refining Corp., L. H. McIntire, pres., plans refinery. $335,000 with equipment. Project being financed through stock issue.

Ill., Chicago—SLAUGHTER HOUSE—Armour & Co., Union Stockyards, Chicago, plans by L. L. Edlund, c/o owner, slaughter house, 43d St. and Packers Ave., Union Stockyards, $1,000,000. Maturity about Nov. 1.

Ill., Evanston—STORAGE—Hughes Oil Co., Howard St., plans repairing and altering storage, Howard St. $40,000 or more. Architect not appointed.

Me., Portland—SUPER SERVICE STATION—Jenney Mfg. Co., 8 India St., Boston, Mass., soon lets contract 1 story, irregular sized, brick, concrete found., Forest Ave. To exceed $28,500. W. A. Gott, 8 India St., Boston, Mass., engr.

Md., Baltimore—PLANT—Fisher Body Corp., General Motors Bldg., Detroit, Mich., plans by Albert Kahn, Inc., New Center Bldg., Detroit, Mich., 2 and 4 story, rein.-con., brick, steel automobile body plant, Broening Hy.

Md., Fairfield—STEAM SERVICE LINES—U. S. Industrial Alcohol Co., 60 East 42nd St., New York, and Curtis Bay, Baltimore, Md., plans 2¼ mi. 12 in. (steel pipe) steam service line from Fairfield to Curtis Bay. To exceed $30,000. T. E. Murray, 88 Lexington Ave., New York, engr.

Mich., Marine City—DISTILLERY—Riverside Distillers & Brewers, Inc., Marine City, plans distillery. To exceed $60,000.

Miss., West Point—GARMENT FACTORY—Royal Mfg. Co., M. Sanderowitz, genl. mgr., plans by Krouse & Brasfield, Kidder Bldg., Meridian, 2 story, 109x272 ft., brick, rein.-con. concrete found., to be known as West Point Vocational Training School, 60,000 sq.ft. floor space. $75,000.

Mo., St. Joseph—PLANT—Seitz Packing Co., 16th and Commercial Sts., plans by Menges Mange, Inc., St. Louis, Mo., plant addition. $40,000 or more.

N. J., Bayonne—BOAT BUILDING PLANT—Electric Boat Co., 40 Wall St., New York, plans altering and repairing boat building plant. To exceed $30,000.

N. J., Linden — ABATTOIR, etc. — Feldman Bros., Laurel St., Elizabeth, plans abattoir, cooler, sheds, etc. $60,000. Stadler Eng. Co., 114 Liberty St., New York, engrs. **Maturity indefinite.**

N. J., Newark — MANUFACTURING, etc. — Bendix Aviation Corp., 545 North Arlington Ave., East Orange, plans by F. Grad & Son, Inc., 1172 Raymond Blvd., manufacturing building, hangar, and administration building, $300,000. **Maturity indefinite.**

N. J., South Amboy—PHOSPHATE PLANT—American Agricultural Chemical Co., 120 Lister Ave., Newark, soon takes bids phosphate plant, $200,000. Some parts under construction.

N. Y., Brooklyn — STORAGE, etc. — Pubnice Realty Corp., 447 Sutter Ave., or c/o J. J. Millman, archt., 191 Joralemon St., plans storage and store, 2nd and Brighton Beach Aves. $50,000.

N. Y., Buffalo — GROCERY DISTRIBUTION and STORAGE—H. J. Boeckel Grocery Co. (Adam Boeckel & Son) soon lets contracts grocery distrfbution and storage, $35,000.

N. Y., Corona—GARAGE, etc.—R. Bartholomew, 69-47 Astoria Ave., plans by G. Saleriri, c/o owner, garage, factory, shoproom, 111th St. and 44th Ave. $35,000

N. Y., Flushing—MARKET, etc.—Swift & Co., 32 10th Ave., New York, soon lets contract 2 story, basement, 87x135 ft., brick, market and smoke house, incl. heating, plumbing, electrical work, Avery Pl. and Lawrence Ave. To exceed $40,000. A. E. Bump, 25 Faneuil Hall, Boston, Mass., engrs. Noted Mar. 29.

N. Y., Mariners Harbor—STORAGE—Wallerstein Co., 125 Lake Ave., plans storage, Lake and Railroad Ave. To exceed $50,000. **Maturity indefinite.** Architect not appointed.

N. Y., New York—SERVICE, REPAIR and GARAGE—C. Zenker, 186 West 4th St., plans by W. Shary, 22 East 17th St., service, repair and garage, Bailey Ave. and Kingsbridge Rd. $28,000 with equipment.

N. Y., New York—SERVICE SHOWROOMS, etc.—J. McCluskey, 2536 Bathgate Ave., plans by W. H. Wright, 347 Madison Ave., 2 story, 83x100 ft., service, shoowroom and auto storage, Fordham Rd. and Bathgate Ave. $55,000 or more.

N. Y., Penn Yan—WINERY—A. Bush Co., Inc., c/o G. W. Steiger, 11 West 42nd St., New York, plans winery. To exceed $70,000. Site acquired.

O., Cleveland—PLANT—Fisher Body Corp., General Motors Bldg., Detroit, Mich., plans rein.-con., brick, steel addition to auto body plant, 40,000 sq.ft. floor space, plain found.

O., Warren—BAKING PLANT—Middletown Distilling Co., c/o E. E. Welch, Mahoning Bank Bldg., Youngstown, soon takes bids reconditioning baking plant for distillery. To exceed $100,000. C. Owsley, Home Savings & Loan Bldg., Youngstown, archts.

Pa., Pittsburgh—DAIRY—Isaly Dairy Co., 3380 Blvd. of Allies, and Ohio and Benita Aves., Youngstown, O., plans being completed by McCormick Co., 121 South Negley St., brick, steel, concrete extension, 3380 Blvd. of Allies. $80,000.

Pa., Pittsburgh—GARAGE—Motor Express Co., c/o H. M. Morse & Co., engrs. and archts., 823 Prospect Ave., Cleveland, O., plans completed 1 story, 30x200 ft. concrete, brick, steel, plain found. $40,000.

Tex., Freer—ICE PLANT—Owner, c/o City, plans 1 story, 50 to 60 ton capacity ice plant. $60,000. C. M. Smith, San Antonio, member of Texas appeal on Ice Code, will hear appucations and decide on who will get permit.

Tex., Longview—BOTTLING PLANT—B. F. Martin & J. Sanger, Longview, making plans 2 story, 50x100 ft., rein.-con. brick, coca-cola bottling plant. $35,000. P. E. Zimmerman, 1st Natl. Bank Bldg., engr.

Utah, Salt Lake City — PLANT — Colorado Animal By-Products Plant, c/o P. H. Soble, 1321 East South Temple St., plans rebuilding plant, destroyed by fire. $75,000.

Va., Fort Royal—DISTILLERY—Blue Ridge Distillers, Inc., A. G. Weaver, Fort Royal, plans distillery. To exceed $100,000. Site acquired.

Wash., Toppenish—REFINERY—Utah Idaho Sugar Co., Vermont Bldg., South Temple St., Salt Lake City, Utah, plans beet sugar refinery. To exceed $50,000. Architect not appointed.

Alta., Calgary—SLAUGHTER HOUSE—Burns & Co. Ltd. plans slaughter house. $50,000.

Alta., Mazeppa—GRAIN ELEVATOR—Searle Grain Co. Ltd. plans grain elevator. $50,000.

B. C., Victoria—SAW MILL, etc.—Cameron Lumber Co. Ltd. plans saw mill and wharf. $150,000. **Maturity this fall.** Private plans.

B. C., Victoria—MILL—Shawinigan Lake Lumber Co. Ltd., plans new mail and all equipment to replace fire loss. $300,000.

Man., Winnopeg — FACTORY — Wings, Ltd., I. J. R. Deacon, pres., making plans aeroplane factory. $50,000.

Ont., Hamilton—PLANT—Columbia Natural Gas & Oil Co., Ltd., A. A. Winter, pres., plans plant and development. $300,000.

Ont., London—PLANT—General Tobacco Packers Ltd., J. D. McCallum, plans plant for manufacture of cigars, cigarettes, tobacco, etc. $40,000.

Ont., Moncton—PLANT—Swift Canadian Co. Ltd. of Toronto, Union Stockyards, preparing plans addition to plant. $50,000.

Ont., North Bay—MILL—Fassett Lumber Co. plans mill. $35,000 or more. Architect not appointed.

Ont., Toronto—COLD STORAGE—Loblaw Grocetarias Co., Ltd., Bathhurst and Fleet Sts., making plans 160x160 ft., cold storage building. $250,000.

Ont., Toronto—POWER PLANT—Noranda Mines Ltd. making plans 20,000 hp. power plant, on the Victoria at junction of the upper Ottawa River. F. A. Gaby, engr.

Ont., Welland—FOUNDRY—Canada Foundries & Forgings Ltd., A. Smith, mgr., preparing plans addition. $60,000.

Que., Montreal—FACTORY—Electric Tamper & Equipment Co. of Canada, Ltd., F. C. Dobell, pres., plans plant for manufacture of engines, machinery, etc. $50,000.

BIDS ASKED

Calif., Lodi — WINERY — See "Contracts Awarded."

Calif., Long Beach — PLANT — Santa Cruz Portland Cement Co., Crocker Bldg., San Francisco, R. A. Kinzie, ch. engr., taking bids general contract cement and sacking plant, West 7th St. $100,000. Noted July 5.

Conn., Hebron—DISTILLERY—See "Contracts Awarded."

Me., Portland — BULK PLANT — See "Contracts Awarded."

R. I., Providence—STORAGE PLANT—See "Contracts Awarded."

Tex., El Paso—BOTTLING PLANT—See "Contracts Awarded."

CONTRACTS AWARDED

Calif., Lodi—WINERY—Monarch Winery, 100x150 ft., brick, steel, concrete, Victor Rd., day labor under supervision of L. Starr, c/o owners, manager of construction. To exceed $40,000.

Conn., Hebron—DISTILLERY—D. Hayes, Victoria Rd., constructing distillery, incl. 40 ft. boiler house, 20 ft. high, altering buildings on site and equipping for distillery. Amston Lake, separate contracts. Mylchreest & Reynolds, Palm St., Hartford, archts. and engrs. To exceed $28,500. Noted Mar. 29.

Conn., Waterbury—BAKERY—Reymond Baking Co., 490 South Main St., 1 story, 55x140 ft., brick, steel addition, to Chas. H. King Co., Watertown Ave. To exceed $30,000. Quality Bakers of America, 120 West 42nd St., New York, archts.

Conn., Waterbury — PLANT — Everybody's Market, East Main St., general contract altering market, incl. electrical cold storage plant, East Main St., to Thomas B. Smith Co., 18 Orange St.***steel, to Toppers & Griggs, Asylum St., Hartford***plumbing, to Barlow Bros., Meadow St.***heating, to M. J. Daly & Son, Inc., 555 Grand St. Est. $35,000. W. E. Hunt, 185 Church St., Torrington, archt.

Ind., Columbus—FACTORY and KILN—National Handle Co., (subsidiary American Fork & Hoe Co.), G. B. Burrell, pres., B. F. Keith Bldg., Cleveland, O., 1 story, 70x70 ft., steel, brick, wood, factory addition and kiln and storage, to Taylor Bros., Columbus. Est. $10,000. Awarded Aug. 27.

Ia., Waterloo—POWER HOUSE—Rath Packing Co., general contract power house for packing plant, to Stone & Webster Eng. Co., 90 Broad St., New York, N. Y., $90,000.

Me., Millinocket—POWER PLANT—Great Northern Paper Co., general contract power plant, to H. J. Deutchbein Co., 350 5th Ave., New York. Est. $80,000. Noted Aug. 23.

Me., Portland—BULK PLANT—Colonial Beacon Oil Co., Everett, and 155 East 44th St., New York, bulk plant, separate contracts, $60,000, Owner now taking bids. Noted Aug. 9.

Mass., Boston—BULK STORAGE PLANT—Richfield Oil Corp., 122 East 42nd St., New York, bulk storage plant addition, separate contracts awarded; storage tanks, to Chicago Bridge & Iron Co., 165 Broadway, New York. To exceed $28,500.

Mass., Erving—PLANT—Erving Paper Mills, plant, to E. J. Kennedy, Jr., Holyoke. Est. $45,000.

Mich., Pleasant Ridge—BREWERY—Voigt Brewing Co., c/o G. A. Mueller, archt., 1001 American Radiator Bldg., Detroit, altering and constructing 2 and 4 story, brick, rein.-con. steel additions to present bakery plant to convert it into brew house, stock house, power house, cellars, etc., Ten Mile Rd., to Stibbard Const. Co., 3000 Grand River Ave., Detroit.

Miss., Charleston—PLANT—Mississippi Clay Co., c/o J. W. Saunders, plant, to C. A. Hupp, Defiance, O. Est. $30,000 or more.

N. J., Rahway—CHEMICAL WORKS—Merck & Co., Lincoln Ave., chemical works, to Salmond, Scrimshaw & Co., 526 Elm St., Arlington. $30,000 plus.

N. J., Whippany—FACTORY, etc.—Agar Mfg. Co., Thomas St., 1 story factory and office, to United Engineers & Constructors, Inc., 80 Park Pl., Newark, about $140,000. E. O. Fisher, c/o owners, archt.

O., Cleveland—PRESS ROOM—Fisher Body Co., General Motors Bldg., Detroit, Mich., 1 story, basement, 139x290 ft., brick, steel, concrete press room addition, to J. A. Utley, Mansiur St., Detroit, Mich.; concrete pile found. to Raymond Concrete Pile Foundation Co., 140 Cedar St., New York. Awarded Aug. 17. Noted Aug. 23.

O., East Cleveland—City bids after Sept. 15, resurfacing and repairing various streets, $23,800. M. Garnett, 14340 Euclid Ave., city engr. P.W.A. granted.

Pa., Phila.—WAREHOUSE—Frankford Grocery Co., Penn Ave. and Unity St., 5 story, warehouse, Griscom, Farina and Penn Sts., to Barclay White Co., 22 North 36th St. Est. $225,000.

R. I., Providence—STORAGE PLANT—Richfield Oil Co., 122 East 42nd St., New York, bulk oil storage plant addition, separate contracts; tanks, to Chicago Bridge & Iron Co., 65 Broadway, New York. Est. $30,000 or more.

Tex., El Paso—BOTTLING PLANT—Harry Mitchell Brewery, bottling plant addition, incl. pasteurizers and bottle washing equipment, to Michael Yundt Co., Waukesha, Wis. To exceed $50,000.

Ont., Toronto—WAREHOUSE and GARAGE—Richardson Constr. Co., Ltd., general contractors, 10 Adelaide St. E., plumbing, heating and sprinklers for warehouse and garage, for Loblaw Groceterias Co. Ltd., Bathurst and Fleet Sts., to Robt. Long & Sons, Ltd., 243 Church St.*** structural steel, to Dominion Bridge Co., Ltd., 1139 Shaw St.***cut stone, to Ritchie Cut Stone Co. Ltd., 159 Bay St.***reinforcing steel, to Burlington Steel Co. Ltd., Hamilton. Noted Aug. 23, under "Contracts Awarded."

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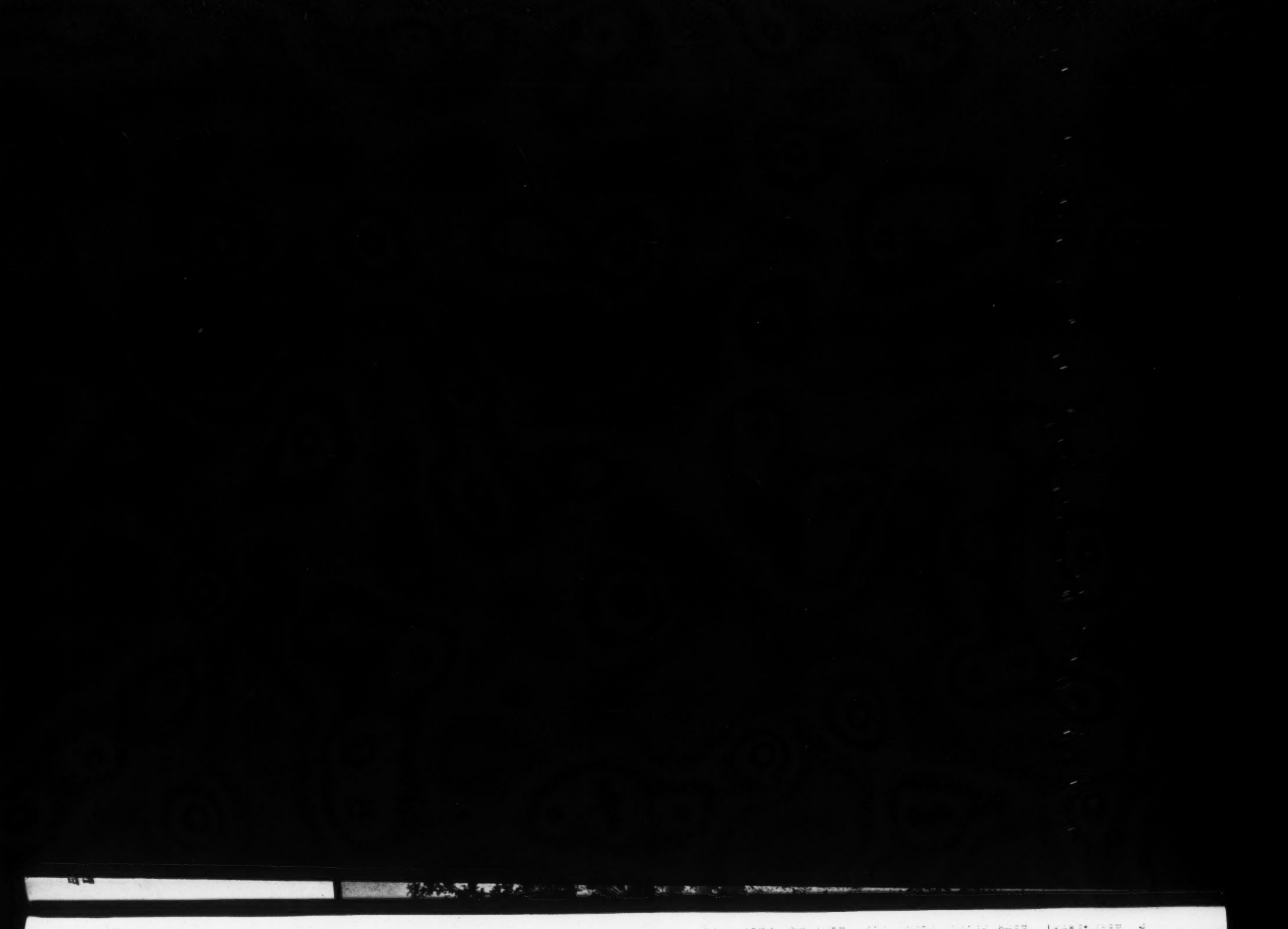
For official proposal advertising see Searchlight Section

†*Federal Government.*